

Ohio Space Grant Consortium
Lead Institution: Ohio Aerospace Institute
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Ohio Space Grant Consortium is a Designated Consortium funded at a level of \$575,000 for fiscal year 2013.

PROGRAM GOALS

The Ohio Space Grant Consortium has the following goals for FY2013 in support of the NASA Office of Education goals. The OSGC 5-Year Strategic Plan, Vision, Mission, Goals and SMART Objectives were redefined, approved and implemented by the OSGC Executive Committee in January, 2010.

Goal 1 - To develop a STEM workforce in Ohio through a comprehensive scholarship and fellowship program at universities and colleges, through internships and educator development programs, and to increase workforce diversity by support of underrepresented groups in higher education to prepare individuals for employment in various NASA-related STEM careers.

Specific: The intent of the scholarship/fellowship programs is to increase the workforce in STEM areas, particularly with regard to female and underrepresented groups.

Measurable: For the combined scholarship/fellowship program our goal is to have 40% female¹ and 20% underrepresented students. 95% of undergraduate scholars will graduate, and 80% will enter STEM fields (education or workforce). 80% of Graduate fellows will graduate within 2 years of the end of the fellowship period and enter STEM fields. Award 1 special minority fellowship annually. Award 2 additional underrepresented scholarships at each OSGC MSI annually. Annually track students who receive significant support through graduation, or until "the next step" via Exit Forms.

¹Percentage was changed from 50% to 40% to reflect the correct NASA target (November, 2011).

All of the aforementioned Specific and Measurable Objectives were met or exceeded except our 40% female target in “Significant” student awards; this goal was met with all Fellowships, Higher Education, and Research Infrastructure student activities which will be reflected in FY13 Student Data tables, namely TABLE A.1. All Direct Student Participant Demographics. In 2012 our female scholarship fraction was reduced to 34.7% when we were unable to repeat our planned focused scholarship allocation. In an effort to meet the 40% female goal in OSGC Fellowships, Higher Education, and Research Infrastructure programs, the OSGC submitted an improvement plan to NASA Headquarters that addresses the decreasing number of participating females in OSGC programs in December, 2013. The improvement plan included goals, SMART objectives, and a timeline consistent with the earlier goals stated in our previous five-year funding proposal to accomplish this.

**Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3; NASA Outcome 2: 2.1, 2.3
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 2 - To support and integrate research and education for faculty and post-doctoral researchers within the State of Ohio through collaborations between universities and with NASA Centers, OSGC affiliates, the State of Ohio, the Ohio Aerospace Institute, the Air Force Research Laboratory, and STEM-related industry.

Specific: We will support seed grants for young faculty at Ohio universities and colleges to enable them to strongly compete for substantial national awards. We will specifically encourage proposals from underrepresented and female faculty.

Measurable: Each year, OSGC will support at least two seed grants for faculty. Within two years of the OSGC award, 50% of our awardees will leverage our support to a more substantial national funding.

All of the aforementioned Specific and Measurable Objectives were met. A grant to develop a new rocket program at The Ohio State University was awarded to Dr. Mei Zhuang (Asian female) (Jack Toth, Student Principal Investigator). Another grant was also provided to Dr. Lesley Berhan (underrepresented female), at The University of Toledo, for "Women in Science Day of Meetings (WISDOM)" where high school girls from the Toledo Public Schools and Washington Local Schools visited The University of Toledo and were mentored by university STEM faculty; UT undergraduates also participated in the program.

**Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.5
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 3 - To encourage the development of new courses and programs that will broaden the availability of STEM curriculum throughout the State of Ohio, especially in rural areas, at Minority Serving Institutions (MSIs) and community colleges, and strengthen existing STEM education programs at affiliate member's schools through support for curriculum and course development.

Specific: OSGC will support course development in STEM areas of particular interest to NASA, particularly at those colleges and universities which are not dominant research institutions, and which serve mainly minority and rural populations. In some cases this will be best achieved by linking two or more schools together in a collaborative effort.

Measurable: Under current funding levels, we will fund at least two curriculum grants during the upcoming five-year cycle.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Continuing curriculum grants were awarded at: Miami University, Wright State University (one underrepresented faculty member) and Lorain County Community College.

Addresses NASA Outcome 1: Objectives 1.4, 1.5

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

Goal 4 - To promote hands-on student projects and activities primarily in higher education activities that will excite, inspire, and engage diverse student populations to become involved in STEM education, ultimately to be integrated into the NASA pipeline and STEM career paths.

Specific: We will fund student-oriented, hands-on projects at several schools within the OSGC network. Results of these projects will be disseminated to the OSGC affiliates, thus leveraging also with Goal 4.

Measurable: A minimum of two projects each year will be funded. At least one of these will be a collaborative effort between two or more schools, and at least one will be oriented toward a rocket or space project.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 1: Objectives 1.2, 1.3, 1.5, 2.4

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1

Goal 5 - To work within our affiliate network with a focus on Minority Serving Institutions (MSIs) and community colleges, to ensure that NASA and STEM opportunities are presented, encouraged, and awarded in accordance with respect for the diverse population of Ohio.

Specific: We will strive to increase interest and activity within the Ohio MSIs and community colleges in STEM higher education and research activities by earmarking additional funding for student and faculty projects at these institutions.

Measurable: We will create and fund at least one student intern each year either at an MSI to work with a research faculty at an Ohio university. Community college scholarships will be specifically directed toward students who wish to matriculate to a higher education facility.

All of the aforementioned Specific and Measurable Objectives were exceeded. OSGC's two Minority Serving Institutions (Central State University and Wilberforce University) are active partners in all OSGC activities. Two students were selected as interns [one underrepresented male from Central State University (HBCU) and one underrepresented female from Wilberforce University (HBCU)] to work with two research faculty members at the University of Cincinnati and The Ohio State University in Summer, 2013. Central State University collaborated with the University of Cincinnati, and Wilberforce University collaborated with The Ohio State University. Each student received a unique research experience in their chosen STEM field, and upon successful completion, each student's experience may likely lead to eventual enrollment in graduate school at the Ohio-based academic institution. In addition, 7 community college scholarships were awarded in FY2013 – which include 2 new awards at Lakeland Community College and Terra State Community College in a few years. We are also pleased to report that 3 community college students from FY2012 have now matriculated into a four-year Engineering program at The Ohio State University and Wright State University. Another student (Leah Oty, female) from FY2011 is studying Engineering at the University of Cincinnati.

Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.4, 1.5

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1

Goal 6 - To encourage and promote K-12 student interest in pursuing higher education STEM curricula by supporting the development of qualified STEM educators through scholarships and workshops, and provide access to NASA educational materials.

Specific: OSGC will fund College of Education scholars who are interested in STEM careers in K-12 education, and connect them with NASA K-12 educational resources. We will encourage higher education schools with student-oriented projects to work with K-12 students to integrate them into aspects of these projects.

Measurable: We will fund a minimum of 12, \$1,000² scholarships each year, using an application process through the education departments at OSGC affiliates. Each scholar will be funded to attend a NASA-sponsored workshop, and given access to NASA educational materials.

All of the aforementioned Specific and Measurable Objectives were exceeded – 15 pre-service teacher (Education) scholarships were awarded. Additionally, all awardees attended a mandatory workshop led by NASA Glenn Research Center personnel at the Ohio Aerospace Institute in November, 2013. A post-workshop evaluation was conducted, with 100 percent of the attendees' responses about the Workshop Content, Activities, and NASA materials were favorable on a 5-point scale ("Strongly Agree", "Agree", "Neutral", "Disagree", "Strongly Disagree", or "Not Applicable").

Addresses NASA Outcome 2: Objectives 2.1, 2.3, 2.4

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

²Increased Education Scholarship awards to \$2,000 in FY2010.

Goal 7 - To encourage the development and focus of outreach programs, courses, teacher professional development, and research projects that align with current areas of emphasis within NASA priorities, as well as the needs of the State of Ohio.

Specific: OSGC will interact and liaison with organizations such as museums, observatories, Greater Cleveland Partnership and others, working to improve the STEM educational opportunities of Ohio.

Measurable: We will fund organizations needing minor funding with “mini-grants” to promote their education and outreach activities. We will support other organizations and volunteer our time to promote their activity when consistent with OSGC spectrum of activities.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 3: Objectives 3.1, 3.3

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

PROGRAM/PROJECT BENEFIT TO OUTCOME (1, 2, & 3)

Three Former Student Testimonials:

1) **Darren M. Conley** (underrepresented male), was the recipient of an OSGC Community College Scholarship in FY2012, Columbus State Community College, Civil Engineering Technology. Darren is scheduled to graduate in December, 2014, and plans to continue his education at a 4-year university. *“The NASA Scholarship Program has had such a profound effect on my on my life that I consider it very instrumental in helping me to grow in educational desire and spirit. Words cannot express how honored and thrilled I am to interact with some of the top Ohio engineering students and faculty.”*

Alignment to Outcomes 1 and 2.

2) **Emma Kunimoto** is currently a rising senior majoring in Mechanical Engineering and participates in “Project High Flight” at Miami University. OSGC supported Emma to participate in RockOn! 2013. *“NASA has been the personification of exploration and innovation and has been a staple in the homes of every math and applied science major since the late 1950s. Taking into account my Mechanical Engineering major it would only make sense that when presented with an opportunity to participate in NASA’s RockOn program I would accept it with open arms. I had heard a lot of good things from colleagues of mine that had attended the previous year and the summary of what they had to say was, it was life changing. Before attending the program I thought the workshop would leave me feeling a little lost in the technicality, and I was a bit fearful of what would be expected of me. I lacked self-confidence before attending because I had never done anything to this magnitude before, but to my delight and surprise, I was wrong in my expectations. After attending the workshop and taking the trip to DC I realized how wrong I really was about how the program would leave me feeling. I went in like I said, expecting it to leave me feeling insecure because I didn’t possess all the knowledge I should have, but it did the exact opposite. Amongst the adversity and*

laborious days I found myself feeling even more confident by the conclusion of the week. It reinvigorated me, and the whole experience shook me to the core. Being able to work with such amazing people and seeing how passionate they were about what we were doing, was really inspiring. This past year I have been struggling to find purpose or passion in anything, and this workshop was the answer for me. It didn't leave me with a passion for sounding rockets (I'm not discounting the awesomeness of them), but it left me hungry to find my own.

The entire experience left me with a new understanding about myself from both a mental and physical stand point. I learned so much about scientific payloads and how they are put together. I learned how to successfully solder and put together a complex circuit board. It was especially neat to be able to transform 5 volts into 1,000 volts just by knowing how electrical schematics worked. This experience did so much for me, and I hope to continue onto RockSat-C next summer. I also hope to add onto what I learned this past week and take my understanding of the basics to a more advanced level. I think the best way to share the importance of this program is by telling it first hand to people that are truly interested in personal growth. Nothing beats hearing it from someone who experienced it. I would like to put together a presentation and present it to the class and then maybe have break-out sessions where we all talk within groups about what we wish to learn and pursue. I think RockOn was symbolic because it stood for the unthinkable. Things you never thought you could do are really right within your reach -- all you have to do is take the first leap.”

Alignment to Outcomes 1 and 2.

3) **Amanda G. McGee**, was the recipient of an OSGC Senior Scholarship in FY2012, and received her B.S. in Aerospace Engineering from the University of Cincinnati in May, 2013. Amanda is currently a Development Engineer at The Goodyear Tire & Rubber Company in Akron, Ohio. *“The NASA/OSGC scholarship has greatly increased the confidence I have in my ability to complete technical research and in my ability to present the results of that research. This scholarship allowed me to explore a topic that I didn't know a lot about to start with, but have come to love. I also developed presentation skills by having the opportunity to show my work at the OSGC Symposium and a couple other professional conferences. This experience gave me confidence that I can take with me to a future job.”*

Alignment to Outcomes 1 and 2.

Outcome 1: *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals: (Employ and Educate).*

OSGC FY2013 goals were met or exceeded except our 40% female target in “Significant” student awards; this goal was met with all Fellowships, Higher Education, and Research Infrastructure student activities which will be reflected in FY13 Student Data tables, namely TABLE A.1. All Direct Student Participant Demographics. In 2012 our female scholarship fraction was reduced to 34.7% when we were unable to repeat our planned focused scholarship allocation. In an effort to meet the 40% female goal in OSGC Fellowships, Higher Education, and Research Infrastructure programs, the OSGC submitted an improvement plan to NASA

Headquarters that addresses the decreasing number of participating females in OSGC programs in December, 2013. The improvement plan included goals, SMART objectives, and a timeline consistent with the earlier goals stated in our previous five-year funding proposal to accomplish this.

Fellowships and Scholarships

OSGC's Fellowship and Scholarship Program provides financial support to students pursuing Science, Technology, Engineering, and Mathematics (STEM) degrees at OSGC member universities. The awards are competitive and are offered to U. S.' citizens. Underrepresented students, women, and persons with disabilities are especially encouraged to apply. A key feature of the program is an emphasis on exposure to research under the direction of a faculty mentor. All awardees are requested to present their research at the annual Student Research Symposium held every April at the Ohio Aerospace Institute (OAI) (OSGC's lead institution) in Cleveland, Ohio. Fellowship recipients (Doctoral 1, 2, and 3 levels and Master's 1 and 2 Levels), and Senior scholarship recipients present oral presentations; Juniors and Community College scholarship recipients present posters, and Pre-service teacher (Education) scholars also present a poster of a future lesson plan incorporating NASA Education materials. All student awardees prepare written reports on their projects/lesson plans, which are published annually (in CD format) as *OSGC Symposium Proceedings*.

Scholarship and Fellowship packets (which include: Applications, Recommendation forms, and Program Flyers) are advertised on the OSGC website, and hard copies are placed on the table of the OSGC Display housed at the Ohio Aerospace Institute. In addition, personalized campus posters and application packets are designed for each school and sent to each of the Campus Representatives for dissemination. Scholarship recipients are selected competitively at each campus through a local selection committee. Fellowships are offered at member schools with a graduate program. Each school selects a maximum of 4 fellowship applications (any combination of Master's or Doctoral). All application packages are formally reviewed and evaluated by Executive Committee members using an OSGC-developed rubric. The rubric evaluation categories include: Academic Achievement, Recommendations and Research Background, Research, and Additional which includes: disadvantaged background, equity, non-academic achievement (community involvement). The scores are then tallied to determine the highest ranking fellow applicants in line for new awards. A special meeting/teleconference is convened for all members of the OSGC Executive Committee to vote and approve all fellowship awardees.

Our home institution, the Ohio Aerospace Institute, annually contributes directly and through solicited foundation and State funds, an additional \$100,000 for fellowships and scholarships.

Graduate Fellowship awards include: Doctoral 1, 2, and 3 levels and Master's 1 and 2 levels. The universities provide a cash cost share plus tuition waivers.

Doctoral 1, 2, and 3 awards are \$20,000 (\$15,000 from OSGC; \$5,000 from university, plus tuition waivers). Graduate Doctoral fellowships are renewable based on academic merit, approval of the student's advisor, and OSGC Campus Representative.

Master's 1 awards are \$16,000 (\$13,000 from OSGC; \$3,000 from university, plus tuition waivers). Master's fellowships are renewable for an additional six-month period based on academic merit, approval of the student's advisor, and OSGC Campus Representative. Master's 2 awards are \$8,000 (\$6,500 from OSGC; \$1,500 from university, plus tuition waivers).

In addition, a Special Minority Fellowship was established in FY2005 to be awarded to an underrepresented student studying for either a Doctoral or Master's Degree at an OSGC-member university with the same requirements and award amounts as noted above.

Undergraduate STEM scholarship awards include: Senior and Junior awards. The universities provide \$500 in cost sharing for each Senior and Junior scholarship award given. Seniors receive \$4,000 (\$3,500 from OSGC; \$500 from university). Juniors receive \$3,000 (\$2,500 from OSGC; \$500 from university). The Junior scholarship is renewable based on academic merit, approval of the student's advisor, and OSGC campus representative. Due to the increasing number of students participating in the Cooperative Field Experience Programs at their universities, a one-semester scholarship award was instituted where qualified awardees receive one-half of the total scholarship award. For example, one-semester Seniors receive \$2,000 (\$1,750 from OSGC; \$250 from university); one-semester Juniors receive \$1,500 (\$1,250 from OSGC; \$250 from university).

Pre-service Teacher (Education) scholarships are open to undergraduate or graduate students pursuing certification and licensure in a Science- or Mathematics-related discipline at an Ohio university through the College of Education. Students receive a \$2,000 scholarship award and are also required to attend a workshop where they receive exposure to NASA educational resources and lesson plans in collaboration with NASA Glenn Research Center Educational Programs Office.

Community College scholarships are one-year \$1,000 awards (\$750 from OSGC; \$250 from community college) with the intention for the student to matriculate to a four-year university.

Two special scholarships are also awarded to honor two former OSGC Directors who passed away. Awards are made to undergraduate students attending the Directors' home universities who are majoring in either Chemical Engineering or Mechanical Engineering: 1) Kenneth J. De Witt Scholarship Award (\$1,000) is a tribute to OSGC's late Director at The University of Toledo to a deserving sophomore majoring in Chemical Engineering; 2) Paul C. K. Lam Scholarship Award (\$1,000) is in memory of OSGC's late Director at The University of Akron and is awarded to an underrepresented, undergraduate student majoring in Mechanical Engineering.

Fellowship and Scholarship Awards

•In FY2013, OSGC has awarded a total of 93 “Significant” scholarship and fellowship awards [8 graduate fellowships (including 1 special minority fellowship award), 61 undergraduate scholarships (including 31 Senior awards; 23 Junior awards; 7 community college awards; 15 pre-service teacher awards; and 2 Special awards honoring OSGC’s two late Directors to undergraduate students attending the Directors’ home universities)]. Of the 93 awards, 21 were made to underrepresented minority students (22.58% - exceeding our 19.55% NCES target!), and 31 awards to female students (33.33% - not meeting the 40% target). OSGC submitted an improvement plan to NASA Headquarters that addresses the decreasing number of participating females in OSGC programs in December, 2013. The plan included goals, SMART objectives, and a timeline consistent with the earlier goals stated in our previous five-year funding proposal to accomplish this. The reduction was due to the absence of Augmentation funding where planned additional Senior scholarship awards were to be reserved for women and underrepresented minorities.

OSGC scholarship/fellowship awards to underrepresented minorities continue to exceed targets based on the State of Ohio percentage of 19.55% (Source: Table 265³). All students who have received significant OSGC support and who have taken their “Next Step” have been successfully tracked to comply with NASA’s Longitudinal Tracking reporting requirements.

- Continue to award Junior and Senior Scholarships to all OSGC member universities (61 awards in FY2013). OSGC’s two HBCUs (i.e., Central State University and Wilberforce University) receive one additional scholarship award for a total of 5 to each university.
- Continue to award Community College Scholarships to all OSGC member community colleges (7 awards in FY2013 which represents an increase from 5 awards in FY2012.). For the first time in a few years, new awards were made at Lakeland Community College and Terra State Community College.
- Continue to award Pre-service Teacher (Education) Scholarships to all OSGC member universities with Colleges of Education (15 awards in FY2013).
- Continue to award the annual Kenneth J. De Witt Scholarship Award (tribute to OSGC’s late Director) at The University of Toledo to a deserving sophomore Chemical Engineering Student. In FY2013, the seventh scholarship was awarded to Ms. Alexa D. Studied (female), sophomore, majoring in Chemical Engineering.

³Table 265: Fall enrollment in degree-granting institutions, by race/ethnicity of student and state or jurisdiction: 2011. Source: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Spring 2012, Enrollment component. (This table was prepared November 2012.)

- Continue to award the annual Paul C. K. Lam Scholarship Award (in memory of OSGC's late Director) at The University of Akron, to an underrepresented, undergraduate student majoring in Mechanical Engineering. In FY2013, the fifth award was made to Ms. Leanna J. Sherman (underrepresented female), Sophomore, majoring in Mechanical Engineering.

- A major accomplishment in this area is OSGC's ability to sustain the annual cost-sharing for scholarship and fellowship awards (i.e., cash contribution for scholarships and fellowships from the lead institution and the academic affiliates). Ohio Aerospace Institute (lead institution) provides \$100,000 cash for scholarships and fellowships annually. Academic affiliates provide a \$500 cash match for each Junior and senior scholarship award and \$250 for each one-semester Junior and senior scholarship award. For Fellowships, academic affiliates provide a cash match of \$5,000 each for Doctoral awards and \$3,000 for Master's 1 and \$1,500 for Master's 2 awards, plus tuition waivers. Community Colleges provide a \$250 cost share for each scholarship award. All students who receive OSGC scholarship or fellowship support are successfully tracked upon exiting the program (taking the "Next Step") to comply with NASA's Longitudinal Tracking reporting requirements. All student awards are also published in OSGC's annual Congressional Book which details all OSGC scholarship and fellowship recipients (broken out by the current 16 Ohio Congressional Districts) since the inception of the program.

Higher Education

- Award seed grants for innovative STEM Higher Education programs at Ohio universities. Some representative titles include continued support of: "Spacecraft Design Rocket and Nanosat Projects" at the University of Cincinnati (Grant W. Schaffner); "Manufacturing Engineering Program Development and Its Potential Impact on Transforming Undergraduate Engineering Curriculum," Wright State University - Lake Campus (P. Ruby Mawasha, (underrepresented male) and Prof. Dennis Hance); "Development of a New Course in Aerospace Curriculum" at Lorain County Community College (Marlin Linger).

- OSGC continued support for the OhioSAT (Ohio State-wide Student-led Satellite Program) in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), and the Ohio Aerospace Institute (OAI). In the current Phase 2 we are seeking to fund programs within the affiliates to perform specific tasks as identified in the AFIT workshop, and directed toward a specific payload. The program will involve collaboration with OSGC, OAI, NASA Glenn Research Center, AFIT, the Air Force Research Laboratory, and ultimately industry partners. Our intent is to fund two university teams for design and construction work during the upcoming academic year on the proposed satellite electronic module. The University of Dayton created a "*Student Satellite Club*" as the result of Ohio SAT project.

- All OSGC scholarship and fellowship recipients attended the 21st Annual OSGC Student Research Symposium on April 5, 2013, at the Ohio Aerospace Institute, in Cleveland, Ohio. All OSGC students present their research and are evaluated by university faculty, NASA engineers and scientists, and Ohio Aerospace Institute Senior Research Associates. Senior Scholars, Master's, and Doctoral Fellows make oral

presentations of their research project. Junior Scholars, and Community College Scholars prepare a poster illustrating their work during a formal poster session. Pre-Service Education Scholars also prepare a poster highlighting a future lesson plan that incorporates NASA educational materials. All students prepare written reports, which are bound and published as *OSGC Symposium Proceedings*. The luncheon keynote speaker was Mr. Gregory L. Robinson, Deputy Director, NASA Glenn Research Center, who filled in for Center Director Jim Free (Miami University alumnus) who was unable to participate. Also, OSGC recruited former scholarship recipients who are now Civil Servants at NASA Glenn Research Center to serve as evaluators for the student presentations.

- Continue to support proposals from affiliate members for Diversity Initiatives which include: Funded 3 Fellowship awards to underrepresented students (1 female; 2 males) at the following Ohio member universities: The Ohio State University received support for 2 fellowships: 1 Doctoral Fellowship (underrepresented male, Special Minority Fellowship) and 1 Master's Fellowship (underrepresented male); The University of Dayton received funding for 1 Doctoral Fellowship (1 underrepresented female).

- OSGC provided funding to support 6 internships in summer, 2013:

- 2 Students at the NASA Academy (plus travel support) (2 male students):

- 1) Luc Bettaieb, NASA Robotics Academy at Marshall Space Flight Center
- 2) Mark T Fellows, NASA Aeronautics Academy at Langley

- 4 Students at NASA Centers and Industry (plus travel support) (2 females, 2 males):

- 1) NASA Ames Research Center, Justin M. Pesich (male)
- 2) Industry Internship @ Cornerstone Research Group, Holly A Mahoney (female)
- 3) Industry Internship @ Orbital Research Group, Inc., Jacquelynn T. Anderson (female)
- 4) Industry Internship @Orbital Research Group, Inc., James Benjamin Lewis (male)

- Provided support for Wright State University (Andrew K. Proeschel), for "NASA Lunar Mining Robot".

- Provided support for Cleveland State University students to assist with the "Cleveland VEX Robotics Competition" held at Cleveland State University on February 8, 2014.

- Supported "Engineering Week" at Case Western Reserve University in Cleveland, Ohio (February, 2014).

- Supported "National Engineers Week" at Miami University (February 16-22, 2014).

- Provided support for the Student Satellite Club at the University of Dayton (John G. Weber, Advisor).

- Provided support for Cleveland State University students to assist with the "Engineer for a Day Program" orientation held in Cleveland, Ohio (February 21, 2014).

- Provided travel support for 6 Education students (4 females, 1 underrepresented female) at Cedarville University to attend the National Science Teachers Association (NSTA) Regional Conference on Science Education held in Charlotte, North Carolina (November 7-9, 2013).

- Provided travel support for Malia Amling (female) OSGC scholarship recipient from Cedarville University, to present her research at MESCON (Math, Engineering, and Science Undergraduate Research Conference), held at the University of Evansville, in Evansville, Indiana (March 23, 2013).

- Provided support for 5 Cedarville University students (all females) to attend the Society of Women Engineers (SWE) National Conference in Baltimore, Maryland (October 24-26, 2013.)
- Provided travel support for 1 faculty member (Jaikrishnan Kadambi) from Case Western Reserve University to attend the “ASME 2013 International Mechanical Engineering Congress & Exposition” in San Diego, California (November 15-21, 2013). It should be noted that Dr. Kadambi organized a Symposium on Wind Turbines: Aerodynamics and Control at this conference.
- Provided travel support for scholarship and fellowship recipients to attend the Annual OSGC Student Research Symposium held at OAI on April 5, 2013.
- Provided travel support for Education scholarship recipients to attend the NASA Pre-Service Teacher Workshop held at OAI on November 1, 2013.
- Provided travel support for Desirée Cotto-Figueroa (underrepresented female), OSGC Doctoral Fellowship recipient, to present her research “Radiation Recoil Effects on the Dynamical Evolution of Asteroids” at the National Council of Space Grant Directors’ Fall Meeting in Charleston, South Carolina, on October 13, 2013.
- Provided travel support for Adam R. Gerlach, OSGC Doctoral Fellowship recipient, to present 3 papers at The American Institute of Aeronautics and Astronautics (AIAA) Infotech@Aerospace Conference in Boston, Massachusetts (August 18-21, 2013). Per Dr. Kelly Cohen, Campus Representative at the University of Cincinnati, ***“Adam had a great defense last Friday. As an OSGC requirement to spend time at a Government Lab as part of his fellowship award, I set him up with Dr. Derek Kingston, UAV (Unmanned Aerial Vehicle), Team Leader at the AFRL (Air Force Research Laboratory) (where I spent my Summer of 2009 as a research fellow). Adam had a terrific summer there, AND was offered a permanent job at AFRL in this very group. He started work 2 weeks ago and is EXTREMELY happy for what OSGC has provided in terms of the perfect launch pad!”***
- Provided travel support for 2 University of Cincinnati students (1 underrepresented female) to present their research at The American Institute of Aeronautics and Astronautics (AIAA) “SCITECH 2014” in National Harbor, Maryland (January 13-17, 2014).
- Provided support for 3 female students and 2 faculty from Miami University (Project High Flight) to travel to Wallops Island for *RockOn!* 2013. *RockOn!* 2013 is a hands-on workshop where students learn how to design and fabricate scientific payloads that are then launched into space. Christopher Koehler, Director of the Colorado Space Grant Consortium (<http://spacegrant.colorado.edu/>), created and currently runs both programs. Miami University had a total of 15 people participating in *RockOn!* 2013.
- Provided support for 2 University of Cincinnati students to attend *RockOn!* 2013.
- Provided support for 1 Lorain County Community College student (underrepresented male) and 1 faculty member to attend *RockOn!* 2013.
- Provided travel support for Wright State University students and faculty to present “Remote Sensor Technology and UAVs in the Analysis of Unwanted Environment Effects of Aerially Applied Chemicals”, at the 2013 National Conference on Undergraduate Research, at the University of Wisconsin-La Crosse, in La Crosse, Wisconsin (April 11-13, 2013).

Student-Innovative-Creative-Hands-on Project (SICHOP) Higher Education Grants:

- Provided support for two teams to participate in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin (April 26-28, 2013): 1) The University of Cincinnati (Grant Schaffner, Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium (R. Aileen Yingst, Director). Plans are to support 3 teams in the 2014 competition (2 returning teams; 1 new team): 1) University of Cincinnati - returning team; 2) Lorain County Community College - returning team; 3) The Ohio State University - new team.
- Provided support for 3 student teams to attend the "2013 RockOn! Workshop" at NASA's Wallops Flight Facility spearheaded by the Colorado Space Grant Consortium (Christopher J. Koehler, Director): 1) University of Cincinnati (Grant W. Schaffner, Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor); 3) Miami University (Robert Setlock, Advisor).
- Provided support to the University of Cincinnati Aircraft Design Team for the design of a transport type airplane with the goal of lifting the most weight possible (John W. Livingston, Advisor).
- Provided support for 2 student NASA Lunabotics Competition teams at: 1) The University of Akron (Thomas T. Hartley, Advisor); 2) Miami University (Harry A. Pierson, Advisor).
- Supported Miami University team of 33 students (12 females; 21 males; 3 underrepresented) for "Project High Flight" (Robert J. Setlock, Advisor).
- Supported students from the University of Cincinnati and Ohio University who participated in "4th Annual Ohio Aerospace Institute (OAI) Industry Forum" held at the Cleveland Marriott Downtown at Key Center, in Cleveland, Ohio, which centered on the theme of "Global Business Opportunities for the Future." Students presented posters, and attendees were afforded unique opportunities to meet both national and international leaders in commercial aviation, defense and aerospace, as well as fully capitalize on the occasion to network with industry peers in an open and accessible venue. The OSGC Director (Gary L. Slater) also attended—along with a faculty member from Lorain County Community College (LCCC) (Marlin Linger) who showcased a display of the rocket team.
- Continue to support student-led balloon satellite/rocketry programs at: Central State University (HBCU), Lorain County Community College, Miami University, University of Cincinnati, The Ohio State University (new team in FY2013), University of Dayton, and Wright State University. Both the University of Cincinnati and Lorain County Community College rocket teams participated in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin (April 26-28, 2013). Plans are to support 3 teams in the 2014 competition (2 returning teams; 1 new team): 1) University of Cincinnati - returning team; 2) Lorain County Community College - returning team; 3) The Ohio State University - new team.

Senior Design Courses

Provided support for 7 senior design courses at Ohio universities/community College (i.e., Lorain County Community College, Miami University, and Wright State University):

•OSGC funded "Project High Flight" at Miami University (Robert J. Setlock, Principal Investigator). An experimental new course was developed (EAS 144) in spring, 2012, and has been continued as the following three permanent courses in spring, 2013:

1) EAS 130A/ESP 130A (Divergent Thinking & Creativity - Project High Flight) - This course will guide students through the creative process of developing original ideas into concepts, and then developing those concepts into designs. Students will explore creativity both as an abstract concept and a personal trait. Students will be introduced to the notions of divergent and convergent thinking, how the two differ, and how divergent thinking is necessary for creativity. Students will then be introduced to the Engineering Design Process as a systematic approach to problem solving that is applicable to a wide variety of different kinds of problems, and explore how both divergent and convergent thinking skills are needed to do it well. While development and utilization of emerging technologies is a feature of this course, it is the creative process and related thinking skills that will be the primary focus. Students of all disciplines are encouraged to enroll.

2) EAS 230A/ESP 230A (Team Work & Motivation - Project High Flight) - This course will build on ideas and concepts introduced in EAS/ESP 130A. Students will learn to apply the Engineering Design Process to develop novel ideas into working prototypes. Students will focus on developing the interpersonal skills needed to supervise a team successfully. Students will take turns supervising various teams throughout the academic year to gain experience. Students will also learn how to use the peer evaluation process as tool for resolving potential conflicts before they become serious problems. They will also learn how to use peer evaluations to assess their team member's performance. While development and utilization of emerging technologies is a feature of this course, it is the creative process and the skills necessary for team supervision that will be the primary focus of this class.

3) EAS 330A/ESP 320A - (Project Management & Innovation - Project High Flight) - This course will build on ideas and concepts introduced in EAS/ESP 130a and EAS/ESP 230a. Students will learn how to organize complicated projects and how to create plans for those projects that others will follow. Students will also learn about the theory of disruptive innovation and about how to develop strategies for maximizing the chances for success of their projects, particularly when a potentially disruptive innovation is being developed. Students will take turns managing various projects throughout the academic year to gain experience. Students will also continue to develop their experience base using the peer evaluation process to facilitate optimal team performance. While development and utilization of emerging technologies is a feature of this course, it is the creative process and the skills necessary for management of successful projects that will be the primary focus of this class.

EAS/ESP 430A will be added next year as the students advance. A new website was also created at Miami University as a result of OSGC funding: <http://projecthighflight.org>

Professor Setlock shared some of the student comments as follows:

"This course is extremely unique, and it encourages students think more creatively by solving problems using what they have learned in other classes. Very interesting guest

speakers, a lot of freedom for students to pursue their interests. The reason why this course was created was to have the students express their creativity side and set goals for themselves. This course provides the first experience of what we will be doing in the workplace. The work is largely independent and the work in the course is toward progress on projects. The work for this class is largely done outside of course meetings. The focus at class meeting times is progress reports or guest speakers. For project work students must meet outside of class to work toward their goal. This is very beneficial to developing the ability of the students to work on their own and lead each other. This is a great course which forms tools not always touched on in engineering classes. This class teaches students more of the interpersonal and soft skills to engineering. Working in groups allowed us to meet other people. Professor Setlock does a great job of making us (students) feel in control, and like we are leaders. This allows us to learn a lot more rapidly, in my opinion, than in a normal class setting. It teaches students to think and problem solve real world problems. This course allows us to be creative and learn concepts that we want to learn. It inspires passion. Allows for a diverse group of students to come together and become a team. I've never seen a course like it and I absolutely love it. I liked how hands-on Project High Flight is and how it allows you to use your creativity in many different groups. This course is such a necessity to engineering students because it challenges to think differently and to work in an interdisciplinary environment. I have gained more real life knowledge by being a part of this class than I have in any of my other classes.”

•OSGC funded Dr. P. Ruby Mawasha (underrepresented male) and Prof. Dennis Hance, Principal Investigators, on their project entitled: “Manufacturing Engineering Program Development” at the Lake Campus of Wright State University, Engineering and Computer Science (ECSP). To foster improvement in undergraduate engineering curriculum via an adaptive, innovative, and transformative Mechanical Engineering Program with a track in Manufacturing Engineering. By working with local industry, regional stake holders, and the College of Engineering and Computer Science at the Dayton campus, the Lake Campus offers undergraduate degree programs in both Mechanical and Manufacturing Engineering. By collaboration with industry and university partners such as Crown Inc., Minster Machines, Cold Water Machines, etc., resources were shared to support workforce development needs that add to degrees in the engineering disciplines. The pilot manufacturing engineering curriculum development project has created a university and industry collaboration effort that (1) integrates curriculum with industry standards; (2) prepares students for the manufacturing engineering career; and (3) provides experiential learning to students.

The students’ engineering skills were developed in five key areas in order for them to successfully design and build a functioning prototype of a manufacturing device: 1) system modeling and identification, 2) design and simulation, 3) converting block diagrams to hardware and software program, 4) real-time digital control implementation, and 5) working sensors and actuators. Specifically, the students have been involved in multiple hands-on and research projects.

The following three courses were created: 1) ME 1030: Introduction to Engineering; 2) ME 1020: Engineering Programming with MATLAB; 3) ME 2020: Mechanical Drawing, Solid Modeling, and Design I. Also, the students' success was measured through participation and involvement in the Dayton Region Manufacturers Association Battle Bots Competition in Dayton, Ohio, and the National Battle Bots Competition in Indianapolis, Indiana. Students have also participated in the OSGC Annual Student Research Symposium and the *National Conferences on Undergraduate Research*. A new website was also created at Wright State University as a result of OSGC funding: http://www.wright.edu/lake/majors/bs_me.html

It should also be noted that Dr. Mawasha and Faculty from the Wright State University - Lake Campus Engineering & Computer Science Program also developed a complete, one-semester robotics course to be implemented at Coldwater High School in 2013 to 2014. Course topics focused on the use of the Parallax BOE BOT robotic platform and ranged from Boolean algebra to electronics applications.

- Continuing support for Professor Marlin Linger, Principal Investigator, Lorain County Community College, for his course PSSC 190, Aerospace Technology. The course provides students with hands-on experience with unmanned aerial drones and large scale model rockets. This was the first time OSGC supported a curriculum grant at a community college.

Research Infrastructure

Award seed grants for innovative STEM Research Infrastructure programs at Ohio universities. Some representative titles include: continued work with "UC BEARSat Nanosatellite Development for Air Force Nanosat-8 Competition," University of Cincinnati (Grant W. Schaffner); "Surveillance for Intelligent Emergency Response Robotic Aircraft (SIERRA)," at the University of Cincinnati (Kelly Cohen); "Nuclear Power for Space Colonization Research and Technology Development, Phase II (Ralph Steckler Project) at The Ohio State University (Thomas E. Blue) and Wilberforce University (HBCU) (Edward Asikele) (underrepresented male).

- In Summer, 2013, the OSGC funded two underrepresented student interns (each from an Ohio HBCU) to work with research faculty at two Ohio universities with the expectation that they each receive a unique research experience in their chosen STEM field, and upon successful completion, each student's experience may likely lead to eventual enrollment in graduate school at the Ohio-based academic institution. Silas A. McCall (underrepresented male), Junior, Manufacturing Engineering, Central State University, worked on the "Study of Epoxy Nano-composites" at the University of Cincinnati. Mahogany M. Williams (underrepresented female), Senior, Computer Engineering, Wilberforce University, worked on "Database Development and the Operation of Supercomputer in Unix/LINUX Environment" at The Ohio State University.

- Wilberforce University collaborated with the Femi Nuclear Power Plant (Monroe, MI) for student/research faculty opportunities. During the each of the visits to the research laboratories, students and faculty members toured the facilities and also conducted experiments on radiation of sample materials, cooling pools, and theoretical aspects of

nuclear reactions. The students collected data for the sample radiation and power generation, then performed the analysis of the data and finalized reports.

Outcome 2: *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty: (Educate and Engage).* **OSGC FY2013 goals were exceeded.**

Precollege

- Award mini-grants to Ohio K-12 teachers for innovative STEM programs. Representative titles include: “Middle School STEM Summer Camp”, Stebbins High School (Jim Prater); “First LEGO League,” Benjamin Logan Local School, (Amy R. McCormick); “The Power of Inquiry & Understanding Math & Science,” Benjamin Logan High School (Sally Stolly); “Rendezvous with a Comet,” Bishop John King Mussio Central Elementary (Anne Marie Krings); “Return to the Moon/Science Olympiad,” St. Pius X School (E. Catherine Ujvagi).
- Awarded grant to The University of Toledo (Kevin P. Czajkowski), "Inspiring Student Science Interest Through Real-World Climate Change Projects".
- Awarded a second mini-grant to Mr. James M. Less, Science Teacher, Bettsville Local Schools, for his project entitled: “Awesome Science Adventures: Students Learn By Teaching”. Note that Mr. Less is a former OSGC Education scholarship recipient (FY2010 and FY2009) who is now teaching in Beltsville, Ohio.
- OSGC offered a pre-service teacher workshop in collaboration with NASA Glenn Research Center Educational Programs Office (EPO) for OSGC education scholars and classroom teachers. Participants received NASA education materials, professional development opportunities, curriculum modules for classroom use, and local resources for enhancing classroom teaching and student experiences in the classroom. Students also had an opportunity participate in hands-on educational activities that can be replicated into a future lesson plan under the guidance of a NASA Education Specialist, Susan M. Kohler. Monica Boyd, Educator Resource Center Coordinator, also presented the merits of the Center to the student audience. The workshop was held at OAI on November 1, 2013. A post-workshop evaluation was conducted, with 100 percent of the attendees’ responses were rated favorably about the Workshop’s Content, Activities, and NASA materials on a 5-point scale ("Strongly Agree", "Agree", "Neutral", "Disagree", "Strongly Disagree", or "Not Applicable"). Additional comments include: *“Today’s workshop was extremely interesting and helpful. I learned how to get my hands on several tools for science classrooms.”* *“Very informative! I liked the hands-on learning and individualized instruction. Good connection to real life instances.”* *“I learned a lot about the website that will play hugely into the development of my own lesson plans.”*

Below is a testimonial from a former Education scholar:

Paul T. Tran was the recipient of an OSGC Education Scholarship in FY2012 and received his B.S. in Education (Cum Laude) from the University of Cincinnati in May, 2013. Paul is currently a Seventh and Eighth Grade Math and Science Teacher in the Cincinnati Public Schools in Cincinnati, Ohio. ***“I had the opportunity to network with future educators and STEM colleagues about the future of mathematics and science in***

education. The pre-service teachers and poster session highlighted the significance of STEM and 21st century skills in education. I am grateful for the opportunity to be able to interact and meet so many outstanding students from Ohio with great passion for both their work and future career. I hope to share the resources I've obtained through the NASA website with future educators and colleagues."
Alignment to Outcomes 1 and 2.

- Continued support for “Flight Camp at the University of Cincinnati for High School/Middle School” (Kelly Cohen) to provide an intensive exposure of aerospace, science, and engineering activities to urban middle and high school students as part of a STEM program aimed at opening opportunities for non-traditional students in the STEM fields who would not otherwise have access to in-depth courses of study, and careers for which they have the abilities, but little information or firsthand knowledge.
- Provided support for Ohio Northern University’s Engineering Pathways Camp where high schools students spend 5 days on campus experiencing a variety of engineering activities led by Ohio Northern faculty in Ada, Ohio (June 16-21, 2013).
- Provided support for Miami University students to assist with the annual “Miami/Talawanda Science Week” activities held in Oxford, Ohio (Week of May 13-17, 2013).
- Sponsorship of the FIRST Buckeye Regional Robotics Competition – 52 high school teams (Ohio has 31 teams – 58 percent) with over 1,300 students from across the country competed in a robotics competition that combines sports with engineering and technology held at Cleveland State University Wolstein Center (March 20-22, 2014). [OSGC receives favorable publicity as a sponsor to this event (i.e., websites, signage, banners, and ads in Ohio newspapers.)] (URL: <http://oai.org/firstbuckeye/>)
- Provided support for Ohio Northern University students and faculty to visit 3 middle schools in Ada, Ohio, to involve Grades 4, 5, and 6 in engineering activities.
- Awarded a mini-grant to St. Vincent – St. Mary High School (Robert J. Engels, Science Teacher/Department Head) for his project entitled: "NASA Student Launch Initiative." One of school’s rocketry teams finished in the top 25 of Team America Rocketry Challenge (TARC) and was invited to submit a proposal to be part of NASA’s Student Launch Program (SLP). NASA’s Student Launch Project (SLP) challenges university and high school students to design, build and launch a reusable rocket to fly one mile above the ground level while carrying a scientific or engineering payload. The project lasts for the entire academic year. Twelve students from STVM prepared a proposal to design and construct a rocket-deployed airship that was to serve as a modular sensor platform. NASA’s acceptance of the proposal meant that the team was required to submit a series of engineering reports and reviews, develop a website, timeline and budget and provide educational outreach within their local community. The SLP project culminated with the team traveling to NASA Marshall Space Flight Center in Huntsville, Alabama in April, 2013, to demonstrate their rocket deployed blimp along with the other teams selected to compete. NASA provided the funding for the rocket and its payload, but the students had to reach out to their local community to raise funds to travel to Huntsville for the five-day trip. The Timken Company provided technical support and engineering expertise to assist the team in the design and testing process. IDS Imaging Development Systems of Woburn, Massachusetts donated a high-speed camera to the STVM rocketry program to

use to capture images of high-speed events to aid in the design and testing of on board rocket systems.

- Provided support for the following Wright State University activities:
 - Engineering and Computer Science Program faculty worked with the Teacher Academy staff to host a Science, Technology, Math, and Engineering day for community second grade students from the Parkway School System from Rockford, Ohio. Students were taught to construct a model aircraft and K'Nex rubber band car. Students were given the chance to demonstrate the functionality of their projects.
 - The Mechanical Engineering Program at the Lake Campus hosted a trebuchet competition at the Coldwater High School for four local high schools in May, 2013. Teachers were also provided technical training and materials.
 - Faculty from the Lake Campus Engineering & Computer Science Program developed a complete, one-semester robotics course to be implemented at Coldwater High School in 2013 to 2014. Course topics focused on the use of the Parallax BOE BOT robotic platform and ranged from Boolean Algebra to electronics applications.
 - Faculty from the Lake Campus Engineering & Computer Science Program developed a complete BattleBOT platform for Dayton Public Schools.
 - Faculty from Lake Campus Engineering & Computer Science Program serves as university mentors to high school faculty from Versailles, Coldwater, Fort Recovery, and Celina High Schools. The university staff members introduced the engineering and mathematics concepts required to develop enhanced abilities at the high school level for students interested in pursuing collegiate studies in engineering.

Outcome 3: *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission: (Engage and Inspire).*

OSGC FY2013 goals were exceeded.

Informal Education

- Support of "WISDOM" (Women in Science Day of Meetings) at The University of Toledo (Lesley Berhan, underrepresented female).
- Sponsorship of "Northeast Ohio Regional and Elementary Science Olympiad" at Case Western Reserve University (Kathryn M. Kwiatkowski).
- Supported the 2013 Women in Engineering Camp at the University of Dayton (July 7-12, 2013) – a week-long, residential summer program that introduces high school females to career opportunities in engineering through classroom activities, hands-on experiments, industry visits, and exposure to engineers as role models.
- Provided support for Ohio Northern University's Camp GEMS (Girls in Engineering, Math and Science) a 4-day campus experience for Grade 7 and 8 females to participate in Science, Engineering, and Math experiments led by Ohio Northern Engineering faculty and students. The camp is held on campus in Ada, Ohio (July 14-17, 2013).
- Cleveland Museum of African American History – permanent home of the "African Americans in Space Science Exhibit".
- Cincinnati Observatory – conducts educational outreach STEM activities.
- Drake Science Center in Cincinnati – conducts structured visits for teachers, students, and parents (over 20K students annually) in astronomy topics.

Miscellaneous OSGC Programs:

- Published and disseminated two OSGC Newsletters. All OSGC newsletters are also available for viewing on the OSGC website at: <http://www.osgc.org/newsletters.html>
- Published and disseminated *2013 OSGC Student Journal*. The *2013 OSGC Student Journal* (in PDF format) is also available for viewing on the OSGC website at: <http://www.osgc.org/studentjournals.html>
- Published and disseminated *2013 OSGC Student Research Symposium Proceedings* – in an effort to reduce paper and be “green”, the Proceedings were produced as a CD. The *2013 OSGC Student Research Symposium Proceedings* (in PDF format) are also available for viewing on the OSGC website at: <http://www.osgc.org/symproceeding.html>
- Updated the annual *OSGC Congressional Book* – which details all OSGC scholarship, fellowship, and internship awards, and mini-grant and seed grant awards since the inception of the program and are broken out by the current Ohio 16 Congressional Districts. These are distributed to each of the 16 Congressional Offices and 2 Senate Offices during annual visits every February.

PROGRAM ACCOMPLISHMENTS

The majority of OSGC programs include Scholarships and Fellowships (with required research component with faculty mentor), Higher Education projects (through Curriculum Innovation Proposal (CIP) / Faculty Research Initiation Grant Proposal (FRIGP) / Student-Innovative-Creative-Hands-on Project (SICHOP) grants), Research Infrastructure projects (Faculty Research Initiation Grant Proposal (FRIGP) grants), Precollege (teacher training thrust and mini-grant program), Informal Education projects (Informal Education Innovation Proposal (IEIP) grants).

Outcome 1: *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals: (Employ and Educate).*

OSGC FY2013 Goals 1-5 were met or exceeded as follows:

Goal 1 - To develop a STEM workforce in Ohio through a comprehensive scholarship and fellowship program at universities and colleges, through internships and educator development programs, and to increase workforce diversity by support of underrepresented groups in higher education to prepare individuals for employment in various NASA-related STEM careers.

All of the aforementioned Specific and Measurable Objectives were met or exceeded except our 40% female target in “Significant” awards; this goal was met with all Fellowships, Higher Education, and Research Infrastructure student activities which will be reflected in FY13 Student Data tables, namely TABLE A.1. All Direct Student Participant Demographics. In 2012 our female scholarship fraction was reduced to 34.7% when we were unable to repeat our planned focused scholarship allocation. In an effort to meet the 40% female goal in OSGC Fellowships, Higher Education, and Research Infrastructure programs, the OSGC submitted an improvement plan to NASA Headquarters that addresses the decreasing number of participating females in OSGC programs in December, 2013. The improvement plan included goals, SMART objectives, and a timeline consistent with the earlier goals stated in our previous five-

year funding proposal to accomplish this.

**Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3; NASA Outcome 2: 2.1, 2.3
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 2 - To support and integrate research and education for faculty and post-doctoral researchers within the State of Ohio through collaborations between universities and with NASA Centers, OSGC affiliates, the State of Ohio, the Ohio Aerospace Institute, the Air Force Research Laboratory, and STEM-related industry.

All of the aforementioned Specific and Measurable Objectives were met. A grant to develop a new rocket program at The Ohio State University was awarded to Dr. Mei Zhuang (Asian female) (Jack Toth, Student Principal Investigator). Another grant was also provided to Dr. Lesley Berhan (underrepresented female), at The University of Toledo, for "Women in Science Day of Meetings (WISDOM)" where high school girls from the Toledo Public Schools and Washington Local Schools visited The University of Toledo and were mentored by university STEM faculty; UT undergraduates also participated in the program.

Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.5

**Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 3 - To encourage the development of new courses and programs that will broaden the availability of STEM curriculum throughout the State of Ohio, especially in rural areas, at Minority Serving Institutions (MSIs) and community colleges, and strengthen existing STEM education programs at affiliate member's schools through support for curriculum and course development.

All of the aforementioned Specific and Measurable Objectives were exceeded. Continuing curriculum grants were awarded at: Miami University, Wright State University (one underrepresented faculty member) and Lorain County Community College.

Addresses NASA Outcome 1: Objectives 1.4, 1.5

**Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1, Outcome 6.4,
Objective 6.4.1**

Goal 4 - To promote hands-on student projects and activities primarily in higher education activities that will excite, inspire, and engage diverse student populations to become involved in STEM education, ultimately to be integrated into the NASA pipeline and STEM career paths.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 1: Objectives 1.2, 1.3, 1.5, 2.4

**Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 5 - To work within our affiliate network with a focus on Minority Serving Institutions (MSIs) and community colleges, to ensure that NASA and STEM

opportunities are presented, encouraged, and awarded in accordance with respect for the diverse population of Ohio.

All of the aforementioned Specific and Measurable Objectives were exceeded. OSGC's two Minority Serving Institutions (Central State University and Wilberforce University) are active partners in all OSGC activities. Two students were selected as interns [one underrepresented male from Central State University (HBCU) and one underrepresented female from Wilberforce University (HBCU)] to work with two research faculty members at the University of Cincinnati and The Ohio State University in Summer, 2013. Central State University collaborated with the University of Cincinnati, and Wilberforce University collaborated with The Ohio State University. Each student received a unique research experience in their chosen STEM field, and upon successful completion, each student's experience may likely lead to eventual enrollment in graduate school at the Ohio-based academic institution. In addition, 7 community college scholarships were awarded in FY2013 – which include 2 new awards at Lakeland Community College and Terra State Community College in a few years. We are also pleased to report that 3 community college students from FY2012 have now matriculated into a four-year Engineering program at The Ohio State University and Wright State University. Another student (Leah Oty, female) from FY2011 is studying Engineering at the University of Cincinnati.

Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.4, 1.5

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1

In FY 2013, the OSGC provided support for **113 student awards** (breakdown is as follows):

- Of the 113 awards, 29 were made to underrepresented students (25.66%).
- Of the 113 awards, 40 were made to female students (35.40%).

Fellowship/Scholarships

- Awarded 93 Scholarships and Fellowships.

Higher Education

- Provided support for 14 student participants in Higher Education programs.

Research Infrastructure

- Provided support for 6 student participants in Research Infrastructure programs.

Achievements and Progress

Fellowship/Scholarships

- Awarded 93 Scholarships and Fellowships:

-61 STEM undergraduate scholarships (32 seniors; 32 juniors)

- 7 Community College scholarships

-15 Pre-service Teacher scholarships

- 2 Special scholarships (honoring two late OSGC Directors at their home universities)

- 8 Graduate Fellowships (5 Doctoral – includes 1 new special minority award; 3 Master's)

-Of the 93 awards, 21 were made to underrepresented students (22.58%).

-Of the 93 awards, 31 were made to female students (33.33%).

- Twenty-First Annual Student Research Symposium was held at the Ohio Aerospace Institute on April 5, 2013, with over 150 attendees.

Higher Education

- Provided support for 14 student participants in Higher Education programs.
 - Of the 14 awards, 2 were made to underrepresented students (14.29%).
 - Of the 14 awards, 6 were made to female students (42.86%).

Supported 14 Higher Education students as interns (industry or NASA Centers), participants in NASA Academy, or as part of the OSGC Higher Education grant program.

- OSGC provided funding to support 6 internships in summer, 2013:

- 2 Students at the NASA Academy (plus travel support) (2 male students):

- 1) Luc Bettaieb, NASA Robotics Academy at Marshall Space Flight Center
- 2) Mark T Fellows, NASA Aeronautics Academy at Langley

- 4 Students at NASA Centers and Industry (plus travel support) (2 females, 2 males):

- 1) NASA Ames Research Center, Justin M. Psych (male)
- 2) Industry Internship @ Cornerstone Research Group, Holly A Mahoney (female)
- 3) Industry Internship @ Orbital Research Group, Inc., Jacquelyn T. Anderson (female)
- 4) Industry Internship @ Orbital Research Group, Inc., James Benjamin Lewis (male)

- Provided support for 8 students participating in innovative STEM Higher Education programs at Ohio member universities.

All students who have received significant OSGC support and who have taken their “next step” have been successfully tracked.

Other Higher Education Program support includes:

- Award seed grants for innovative STEM Higher Education programs at Ohio universities. Some representative titles include continued support of: “Spacecraft Design Rocket and Nan sat Projects” at the University of Cincinnati (Grant W. Schaffner); “Manufacturing Engineering Program Development and Its Potential Impact on Transforming Undergraduate Engineering Curriculum,” Wright State University - Lake Campus (P. Ruby Mawasha, (underrepresented male) and Prof. Dennis Hence); “Development of a New Course in Aerospace Curriculum” at Lorain County Community College (Marlin Linger).

- OSGC continued support for the Ohio SAT (Ohio State-wide Student-led Satellite Program) in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), and the Ohio Aerospace Institute (OAI). In the current Phase 2 we are seeking to fund programs within the affiliates to perform specific tasks as identified in the AFIT workshop, and directed toward a specific payload. The program will involve collaboration with OSGC, OAI, NASA Glenn Research Center, AFIT, the Air Force Research Laboratory, and ultimately industry partners. Our intent is to fund two university teams for design and construction work during the upcoming academic year on the proposed satellite electronic module. The University of Dayton created a “*Student Satellite Club*” as the result of Ohio SAT project.

- All OSGC scholarship and fellowship recipients attended the 21st Annual OSGC Student Research Symposium on April 5, 2013, at the Ohio Aerospace Institute, in Cleveland, Ohio. All OSGC students present their research and are evaluated by university faculty, NASA engineers and scientists, and Ohio Aerospace Institute Senior Research Associates. Senior Scholars, Master’s, and Doctoral Fellows make oral presentations of their research project. Junior Scholars, and Community College Scholars prepare a poster illustrating their work during a formal poster session. Pre-Service Education Scholars also prepare a poster highlighting a future lesson plan that incorporates NASA educational materials. All students prepare written reports, which are bound and published as *OSGC Symposium Proceedings*. The luncheon keynote speaker was Mr. Gregory L. Robinson, Deputy Director, NASA Glenn Research Center, who filled in for Center Director Jim Free (Miami University alumnus) who was unable to participate. Also, OSGC recruited former scholarship recipients who are now Civil Servants at NASA Glenn Research Center to serve as evaluators for the student presentations.

- Continue to support proposals from affiliate members for Diversity Initiatives which include: Funded 3 Fellowship awards to underrepresented students (1 female; 2 males) at the following Ohio member universities: The Ohio State University received support for 2 fellowships: 1 Doctoral Fellowship (underrepresented male, Special Minority Fellowship) and 1 Master’s Fellowship (underrepresented male); The University of Dayton received funding for 1 Doctoral Fellowship (1 underrepresented female).

- Provided support for Wright State University (Andrew K. Proeschel), for "NASA Lunar Mining Robot".

- Provided support for Cleveland State University students to assist with the “Cleveland VEX Robotics Competition” held at Cleveland State University on February 8, 2014.

- Supported “Engineering Week” at Case Western Reserve University in Cleveland, Ohio (February, 2014).

- Supported “National Engineers Week” at Miami University (February 16-22, 2014).

- Provided support for the Student Satellite Club at the University of Dayton (John G. Weber, Advisor).

- Provided support for Cleveland State University students to assist with the “Engineer for a Day Program” orientation held in Cleveland, Ohio (February 21, 2014).

- Provided travel support for 6 Education students (4 females, 1 underrepresented female) at Cedarville University to attend the National Science Teachers Association (NSTA) Regional Conference on Science Education held in Charlotte, North Carolina (November 7–9, 2013).

- Provided travel support for Malia Amling (female) OSGC scholarship recipient from Cedarville University, to present her research at MESCON (Math, Engineering, and Science Undergraduate Research Conference), held at the University of Evansville, in Evansville, Indiana (March 23, 2013).

- Provided support for 5 Cedarville University students (all females) to attend the Society of Women Engineers (SWE) National Conference in Baltimore, Maryland (October 24-26, 2013.)

- Provided travel support for 1 faculty member (Jaikrishnan Kadambi) from Case Western Reserve University to attend the “ASME 2013 International Mechanical Engineering Congress & Exposition” in San Diego, California (November 15-21, 2013). It should be

noted that Dr. Kadambi organized a Symposium on Wind Turbines: Aerodynamics and Control at this conference.

- Provided travel support for scholarship and fellowship recipients to attend the Annual OSGC Student Research Symposium held at OAI on April 5, 2013.
- Provided travel support for Education scholarship recipients to attend the NASA Pre-Service Teacher Workshop held at OAI on November 1, 2013.
- Provided travel support for Desirée Cotto-Figueroa (underrepresented female), OSGC Doctoral Fellowship recipient, to present her research “Radiation Recoil Effects on the Dynamical Evolution of Asteroids” at the National Council of Space Grant Directors’ Fall Meeting in Charleston, South Carolina, on October 13, 2013.
- Provided travel support for Adam R. Gerlach, OSGC Doctoral Fellowship recipient, to present 3 papers at The American Institute of Aeronautics and Astronautics (AIAA) Infotech@Aerospace Conference in Boston, Massachusetts (August 18-21, 2013). Per Dr. Kelly Cohen, Campus Representative at the University of Cincinnati
- Provided travel support for 2 University of Cincinnati students (1 underrepresented female) to present their research at The American Institute of Aeronautics and Astronautics (AIAA) “SCITECH 2014” in National Harbor, Maryland (January 13-17, 2014).
- Provided support for 3 female students and 2 faculty from Miami University (Project High Flight) to travel to Wallops Island for *RockOn!* 2013. *RockOn!* 2013 is a hands-on workshop where students learn how to design and fabricate scientific payloads that are then launched into space. Christopher Koehler, Director of the Colorado Space Grant Consortium (<http://spacegrant.colorado.edu/>), created and currently runs both programs. Miami University had a total of 15 people participating in *RockOn!* 2013.
- Provided support for 2 University of Cincinnati students to attend *RockOn!* 2013.
- Provided support for 1 Lorain County Community College student (underrepresented male) and 1 faculty member to attend *RockOn!* 2013.
- Provided travel support for Wright State University students and faculty to present “Remote Sensor Technology and UAVs in the Analysis of Unwanted Environment Effects of Aerially Applied Chemicals”, at the 2013 National Conference on Undergraduate Research, at the University of Wisconsin-La Crosse, in La Crosse, Wisconsin (April 11-13, 2013).

Student-Innovative-Creative-Hands-on Project (SICHOP) Higher Education Grants:

- Provided support for two teams to participate in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin (April 26-28, 2013): 1) The University of Cincinnati (Grant Schaffner, Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium (R. Aileen Yingst, Director). Plans are to support 3 teams in the 2014 competition (2 returning teams; 1 new team): 1) University of Cincinnati - returning team; 2) Lorain County Community College - returning team; 3) The Ohio State University - new team.
- Provided support for 3 student teams to attend the "2013 RockOn! Workshop" at NASA's Wallops Flight Facility spearheaded by the Colorado Space Grant Consortium (Christopher J. Koehler, Director): 1) University of Cincinnati (Grant W. Schaffner,

Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor); 3) Miami University (Robert Setlock, Advisor).

- Provided support to the University of Cincinnati Aircraft Design Team for the design of a transport type airplane with the goal of lifting the most weight possible (John W. Livingston, Advisor).

- Provided support for 2 student NASA Lunabotics Competition teams at: 1) The University of Akron (Thomas T. Hartley, Advisor); 2) Miami University (Harry A. Pierson, Advisor).

- Supported Miami University team of 33 students (12 females; 21 males; 3 underrepresented) for "Project High Flight" (Robert J. Setlock, Advisor).

- Supported students from the University of Cincinnati and Ohio University who participated in "4th Annual Ohio Aerospace Institute (OAI) Industry Forum" held at the Cleveland Marriott Downtown at Key Center, in Cleveland, Ohio, which centered on the theme of "Global Business Opportunities for the Future." Students presented posters, and attendees were afforded unique opportunities to meet both national and international leaders in commercial aviation, defense and aerospace, as well as fully capitalize on the occasion to network with industry peers in an open and accessible venue. The OSGC Director (Gary L. Slater) also attended—along with a faculty member from Lorain County Community College (LCCC) (Marlin Linger) who showcased a display of the rocket team.

- Continue to support student-led balloon satellite/rocketry programs at: Central State University (HBCU), Lorain County Community College, Miami University, University of Cincinnati, The Ohio State University (new team in FY2013), University of Dayton, and Wright State University. Both the University of Cincinnati and Lorain County Community College rocket teams participated in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin (April 26-28, 2013). Plans are to support 3 teams in the 2014 competition (2 returning teams; 1 new team): 1) University of Cincinnati - returning team; 2) Lorain County Community College - returning team; 3) The Ohio State University - new team.

Senior Design Courses

Provided support for 7 senior design courses at Ohio universities/community colleges (i.e., Lorain County Community College, Miami University, and Wright State University).

Research Infrastructure

- Provided support for 6 student participants in Research Infrastructure programs.

- Of the 6 awards, all 6 were made to underrepresented students (100.00%).

- Of the 6 awards, 3 were made to female students (50.00%).

Award seed grants for innovative STEM Research Infrastructure programs at Ohio universities. Some representative titles include: continued work with "UC BEARSat Nanosatellite Development for Air Force Nanosat-8 Competition," University of Cincinnati (Grant W. Schaffner); "Surveillance for Intelligent Emergency Response Robotic Aircraft (SIERRA)," at the University of Cincinnati (Kelly Cohen); "Nuclear Power for Space Colonization Research and Technology Development, Phase II (Ralph

Steckler Project) at The Ohio State University (Thomas E. Blue) and Wilberforce University (HBCU) (Edward Asikele) (underrepresented male).

•In Summer, 2013, the OSGC funded two underrepresented student interns (each from an Ohio HBCU) to work with research faculty at two Ohio universities with the expectation that they each receive a unique research experience in their chosen STEM field, and upon successful completion, each student's experience may likely lead to eventual enrollment in graduate school at the Ohio-based academic institution. Silas A. McCall (underrepresented male), Junior, Manufacturing Engineering, Central State University, worked on the "Study of Epoxy Nano-composites" at the University of Cincinnati. Mahogany M. Williams (underrepresented female), Senior, Computer Engineering, Wilberforce University, worked on "Database Development and the Operation of Supercomputer in Unix/LINUX Environment" at The Ohio State University.

Other Research Infrastructure Program support includes:

Wilberforce University collaborated with the Femi Nuclear Power Plant (Monroe, MI) for student/research faculty opportunities. During the each of the visits to the research laboratories, students and faculty members toured the facilities and also conducted experiments on radiation of sample materials, cooling pools, and theoretical aspects of nuclear reactions. The students collected data for the sample radiation and power generation, then performed the analysis of the data and finalized reports.

All students who have received significant OSGC support and who have taken their "next step" have been successfully tracked.

Outcome 2: *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty: (Educate and Engage).*

OSGC FY2013 Goal 6 was exceeded.

Goal 6 - To encourage and promote K-12 student interest in pursuing higher education STEM curricula by supporting the development of qualified STEM educators through scholarships and workshops, and provide access to NASA educational materials.

Addresses NASA Outcome 2: Objectives 2.1, 2.3, 2.4

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2;

Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

- Provided support for 15 pre-service teachers at a workshop held at OAI (November 1, 2013) in collaboration with NASA Glenn Research Center Educational Programs Office. Student participants received hands-on training and NASA education materials.

- Provided support for 7 teacher mini-grants for innovative K-12 teaching in Ohio schools.
 - 1) "Middle School STEM Summer Camp", Stebbins High School (Jim Prater)
 - 2) "First LEGO League," Benjamin Logan Local School, (Amy R. McCormick)
 - 3) "The Power of Inquiry & Understanding Math & Science," Benjamin Logan High School (Sally Stolly)
 - 4) "Rendezvous with a Comet," Bishop John King Mussio Central Elementary (Anne Marie Krings)

- 5) "Return to the Moon/Science Olympiad," St. Pius X School (E. Catherine Ujvagi).
- 6) "Awesome Science Adventures: Students Learn By Teaching", Bettsville Local Schools, (James M. Less)
- 7) "NASA Student Launch Initiative," St. Vincent – St. Mary High School (Robert J. Engels)

Other Precollege Program support includes:

- Awarded grant to The University of Toledo (Kevin P. Czajkowski), "Inspiring Student Science Interest Through Real-World Climate Change Projects".
- Continuing support to Ohio University, Ryan L. Fogt, "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)".
- Continued support for "Flight Camp at the University of Cincinnati for High School/Middle School" (Kelly Cohen) to provide an intensive exposure of aerospace, science, and engineering activities to urban middle and high school students as part of a STEM program aimed at opening opportunities for non-traditional students in the STEM fields who would not otherwise have access to in-depth courses of study, and careers for which they have the abilities, but little information or firsthand knowledge.
- Provided support for Ohio Northern University's Engineering Pathways Camp where high schools students spend 5 days on campus experiencing a variety of engineering activities led by Ohio Northern faculty in Ada, Ohio (June 16-21, 2013).
- Provided support for Miami University students to assist with the annual "Miami/Talawanda Science Week" activities held in Oxford, Ohio (Week of May 13-17, 2013).
- Sponsorship of the FIRST Buckeye Regional Robotics Competition – 52 high school teams (Ohio has 31 teams – 58 percent) with over 1,300 students from across the country competed in a robotics competition that combines sports with engineering and technology held at Cleveland State University Wolstein Center (March 20-22, 2014). [OSGC receives favorable publicity as a sponsor to this event (i.e., websites, signage, banners, and ads in Ohio newspapers.)] (URL: <http://oai.org/firstbuckeye/>)
- Provided support for Ohio Northern University students and faculty to visit 3 middle schools in Ada, Ohio, to involve Grades 4, 5, and 6 in engineering activities.
- Provided support for the following Wright State University activities:
 - Engineering and Computer Science Program faculty worked with the Teacher Academy staff to host a Science, Technology, Math, and Engineering day for community second grade students from the Parkway School System from Rockford, Ohio. Students were taught to construct a model aircraft and K'Nex rubber band car. Students were given the chance to demonstrate the functionality of their projects.
 - The Mechanical Engineering Program at the Lake Campus hosted a trebuchet competition at the Coldwater High School for four local high schools in May, 2013. Teachers were also provided technical training and materials.
 - Faculty from the Lake Campus Engineering & Computer Science Program developed a complete, one-semester robotics course to be implemented at Coldwater High School in 2013 to 2014. Course topics focused on the use of the Parallax BOE BOT robotic platform and ranged from Boolean algebra to electronics applications.
 - Faculty from the Lake Campus Engineering & Computer Science Program developed a complete BattleBOT platform for Dayton Public Schools.

- Faculty from Lake Campus Engineering & Computer Science Program serves as university mentors to high school faculty from Versailles, Coldwater, Fort Recovery, and Celina High Schools. The university staff members introduced the engineering and mathematics concepts required to develop enhanced abilities at the high school level for students interested in pursuing collegiate studies in engineering

Outcome 3: *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission (Engage and Inspire).*

OSGC FY2013 Goal 7 was exceeded.

Goal 7 - To encourage the development and focus of outreach programs, courses, teacher professional development, and research projects that align with current areas of emphasis within NASA priorities, as well as the needs of the State of Ohio.

Addresses NASA Outcome 3: Objectives 3.1, 3.3

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2;

Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

Informal Education

- Support of “WISDOM” (Women in Science Day of Meetings) at the University of Toledo (Lesley Berhan, underrepresented female).
- Sponsorship of “Northeast Ohio Regional and Elementary Science Olympiad” at Case Western Reserve University (Kathryn M. Kwiatkowski).
- Supported the 2013 Women in Engineering Camp at the University of Dayton (July 7-12, 2013) – a week-long, residential summer program that introduces high school females to career opportunities in engineering through classroom activities, hands-on experiments, industry visits, and exposure to engineers as role models.
- Provided support for Ohio Northern University’s Camp GEMS (Girls in Engineering, Math and Science) a 4-day campus experience for Grade 7 and 8 females to participate in Science, Engineering, and Math experiments led by Ohio Northern Engineering faculty and students. The camp is held on campus in Ada, Ohio (July 14-17, 2013).
- Cleveland Museum of African American History – permanent home of the “African Americans in Space Science Exhibit”.
- Cincinnati Observatory – conducts educational outreach STEM activities.
- Drake Science Center in Cincinnati – conducts structured visits for teachers, students, and parents (over 20K students annually) in astronomy topics.

Miscellaneous OSGC Programs:

- Published and disseminated two OSGC Newsletters. All OSGC newsletters are also available for viewing on the OSGC website at: <http://www.osgc.org/newsletters.html>
- Published and disseminated 2013 OSGC Student Journal. The 2013 OSGC Student Journal (in PDF format) is also available for viewing on the OSGC website at: <http://www.osgc.org/studentjournals.html>
- Published and disseminated 2013 OSGC Student Research Symposium Proceedings – in an effort to reduce paper and be “green”, the Proceedings were produced as a CD. The 2013 OSGC Student Research Symposium Proceedings (in PDF format) are also available for viewing on the OSGC website at: <http://www.osgc.org/symproceeding.html>

- Updated the annual *OSGC Congressional Book* – which details all OSGC scholarship, fellowship, and internship awards, and mini-grant and seed grant awards since the inception of the program and are broken out by the current Ohio 16 Congressional Districts. These are distributed to each of the 16 Congressional Offices and 2 Senate Offices during annual visits every February.

PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE MEASURES

- **Student Data and Longitudinal Tracking:** Number of program student participants employed by NASA, aerospace contractors, universities, and other educational institutions; Number of undergraduate students who move on to advanced education in NASA-related disciplines; Number of underrepresented and underserved students participating.

- **Student Data and Longitudinal Tracking:**

Total Awards	=	113*
Fellowship/Scholarship/	=	93
Higher Education	=	14
Research Infrastructure	=	6

Total Underrepresented = 25.66% (29 students) Exceeds target!

Total Females = 35.40% (40 students) Did not meet target!*

In FY2013, of the total 113 student awards, the total of participating underrepresented students was 29 (25.66%) which exceeded the OSGC’s target of 20% and the National Center for Education Statistics (Table 265) target of 19.55%. The total of participating female students was 40 (35.40%) which did not meet the NASA target of 40%. This was due to the absence of Augmentation funding where planned additional senior scholarship awards were to be reserved for women and underrepresented minorities. **Note that an improvement plan to address increased female participation in OSGC Programs was addressed and submitted to NASA Headquarters in December, 2013.*

In FY2013, for the 113 total awards, tracking information thus far indicates that 46 students will graduate; 16 accepted STEM positions in an aerospace industry, STEM workforce, or K-12 STEM Academic Field; 15 are going to pursue advanced STEM degrees, and the remaining 15 are currently pursuing their options. The remaining 67 students are still in school completing their degree requirements. Other tracking information will be provided upon evaluation of completed Student Exit Forms in Spring, 2013. Note these numbers may be revised when additional reporting information is collected and reported in the NASA Office of Education Performance Measurement (OEPM) system.

- **Minority-Serving Institution Collaborations:** The OSGC currently has two universities designated as Minority Serving Institutions (MSIs)/Historically Black

Colleges and Universities (HBCUs): Central State University (CSU) and Wilberforce University (WU). Both of these institutions are federally recognized as Historically Black Colleges and Universities (HBCUs). Both CSU and WU are charter affiliate members of the OSGC. Five OSGC scholarships are awarded to STEM students at each of the two universities. Neither of the two universities has a graduate-degree program; however, students who attend graduate school at other affiliates are strongly encouraged to apply for OSGC fellowships.

- In Summer, 2013, the OSGC funded two underrepresented student interns representing each of the Ohio HBCUs—Central State University and Wilberforce University—to work with research faculty at two Ohio universities with the expectation that they each receive a unique research experience in their chosen STEM field, and upon successful completion, each student’s experience may likely lead to eventual enrollment in graduate school at the Ohio-based academic institution. Silas A. McCall (underrepresented male), Junior, Manufacturing Engineering, Central State University, worked on the “*Study of Epoxy Nano-composites*” at the University of Cincinnati. Mahogany M. Williams (underrepresented female), Senior, Computer Engineering, Wilberforce University, worked on “*Database Development and the Operation of Supercomputer in Unix/LINUX Environment*” at The Ohio State University.
- One Affiliate HBCU (Wilberforce University) collaborated with the Femi Nuclear Power Plant (Monroe, MI) for student/research faculty opportunities. During the each of the visits to the research laboratories, students and faculty members toured the facilities and also conducted experiments on radiation of sample materials, cooling pools, and theoretical aspects of nuclear reactions. The students collected data for the sample radiation and power generation, then performed the analysis of the data and finalized reports.
- One Affiliate HBCU (Central State University) has an active balloon satellite program with another launch planned for either spring or summer, 2014.
- OSGC offers one special minority fellowship award annually, and although not a requirement of the award, both HBCUs (Wilberforce University and Central State University) have students who are made aware of the opportunity and are encouraged to apply. One Special Minority Doctoral fellowship was awarded in FY2013 to Luis C. Herrera (underrepresented male), PhD, Electrical Engineering, at The Ohio State University.

Other OSGC MSI initiatives include:

- Wilberforce University (Dr. Edward Asikele, underrepresented male) is collaborating with The Ohio State University (Dr. Thomas E. Blue) on Phase II of the “Nuclear Power for Space Colonization Research and Technology Development” for the Ralph Steckler Opportunity.

- **NASA Education Priorities:**

- **Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related,**

STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities.

- OSGC provided funding to support 2 male students to participate in the NASA Academy and for travel during Summer, 2013:
 - Luc Bettaieb, NASA Robotics Academy at Marshall Space Flight Center
 - Mark T Fellows, NASA Aeronautics Academy at Langley
- OSGC provided funding to support 4 internships and for travel (2 females, 2 males) at NASA Centers, and with industry during Summer, 2013:
 - Internship at NASA Ames Research Center, Justin M. Pesich (male)
 - Industry Internship at Cornerstone Research Group, Holly A Mahoney (female)
 - Industry Internship at Orbital Research Group, Inc., Jacquelynn T. Anderson (female)
 - Industry Internship at Orbital Research Group, Inc., James Benjamin Lewis (male)

Other student-led hands-on experiences include:

- Provided support for two teams to participate in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin (April 26-28, 2013): 1) The University of Cincinnati (Grant Schaffner, Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium (R. Aileen Yingst, Director). Plans are to support 3 teams in the 2014 competition (2 returning teams; 1 new team): 1) University of Cincinnati - returning team; 2) Lorain County Community College - returning team; 3) The Ohio State University - new team.
- Provided support for 3 student teams to attend the "2013 RockOn! Workshop" at NASA's Wallops Flight Facility spearheaded by the Colorado Space Grant Consortium (Christopher J. Koehler, Director): 1) University of Cincinnati (Grant W. Schaffner, Advisor); 2) Lorain County Community College (LCCC) (Marlin Linger, Advisor); 3) Miami University (Robert Setlock, Advisor).
- Provided support to the University of Cincinnati Aircraft Design Team for the design of a transport type airplane with the goal of lifting the most weight possible (John W. Livingston, Advisor).
- Provided support for 2 student NASA Lunabotics Competition teams at: 1) The University of Akron (Thomas T. Hartley, Advisor); 2) Miami University (Harry A. Pierson, Advisor).
- Supported Miami University team of 33 students (12 females; 21 males; 3 underrepresented) for "Project High Flight" (Robert J. Setlock, Advisor).
- Continue to support student-led balloon satellite/rocketry programs at: Central State University (HBCU), Lorain County Community College, Miami University, University of Cincinnati, The Ohio State University (new rocket team in FY2013), University of Dayton, and Wright State University.
- Provided travel support for 2 University of Cincinnati students (1 underrepresented female) to present their research at The American Institute of Aeronautics and

- Astronautics (AIAA) “SCITECH 2014” in National Harbor, Maryland (January 13-17, 2014).
- Provided support for 3 female students and 2 faculty from Miami University (Project High Flight) to travel to Wallops Island for *RockOn! 2013*. *RockOn! 2013* is a hands-on workshop where students learn how to design and fabricate scientific payloads that are then launched into space. Christopher Koehler, Director of the Colorado Space Grant Consortium created and currently runs the program (<http://spacegrant.colorado.edu/>). Miami University had a total of 15 people participating in *RockOn! 2013*.
 - Provided support for 2 University of Cincinnati students to attend *RockOn! 2013*.
 - Provided support for 1 Lorain County Community College student (underrepresented male) and 1 faculty member to attend *RockOn! 2013*.
 - Provided travel support for 15 Education scholarship recipients (11 females) to attend the NASA Pre-Service Teacher Workshop in collaboration with NASA Glenn Research Center Educational Programs Office held at OAI on November 1, 2013.
 - Provided support for Wright State University (Andrew K. Proeschel), for "NASA Lunar Mining Robot".
 - Provided travel support for Malia Amling (female) OSGC scholarship recipient from Cedarville University, to present her research at MESCON (Math, Engineering, and Science Undergraduate Research Conference), held at the University of Evansville, in Evansville, Indiana (March 23, 2013).
 - Provided travel support for Desirée Cotto-Figueroa (underrepresented female), OSGC Doctoral Fellowship recipient, to present her research “Radiation Recoil Effects on the Dynamical Evolution of Asteroids” at the National Council of Space Grant Directors’ Fall Meeting in Charleston, South Carolina, on October 13, 2013.
 - Provided travel support for Adam R. Gerlach, OSGC Doctoral Fellowship recipient, to present 3 papers at The American Institute of Aeronautics and Astronautics (AIAA) Infotech@Aerospace Conference in Boston, Massachusetts (August 18-21, 2013).
 - Provided travel support for 2 University of Cincinnati students (1 underrepresented female) to present their research at The American Institute of Aeronautics and Astronautics (AIAA) “SCITECH 2014” in National Harbor, Maryland (January 13-17, 2014).
- **Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines (see above).**
- Continued support through the OSGC research grant awarded to Ohio University, Ryan L. Fogt, "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)", has enhanced Earth Science Education at 6 Ohio middle schools (focus on Grades 7-8), and particularly Antarctic Climate Change, through hands-on measurements. Operational weather stations have been installed and all the teachers have been trained on GLOBE protocol and the use of their weather station for in-class education. Curricular materials have also been

provided that both teachers and students can use to enhance their education/learning/instruction.

- Continued support for “Flight Camp at the University of Cincinnati for High School/Middle School” (Kelly Cohen) to provide an intensive exposure of aerospace, science, and engineering activities to urban middle and high school students.
- Continue to provide training and resources to OSGC pre-service teachers (education scholars) through NASA-led workshops. OSGC Education scholars are required to incorporate NASA content materials into their education project/future lesson plan as a requirement of the scholarship award.

➤ **Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers.**

- Provided support for Ohio Northern University’s Camp GEMS (Girls in Engineering, Math and Science) a 4-day campus experience for Grade 7 and 8 females to participate in Science, Engineering, and Math experiments led by Ohio Northern Engineering faculty and students. The camp is held on campus in Ada, Ohio (July 14-17, 2013).
- Provided support for Ohio Northern University’s Engineering Pathways Camp where high schools students spend 5 days on campus experiencing a variety of engineering activities led by Ohio Northern faculty in Ada, Ohio (June 16-21, 2013).
- Supported the Women in Engineering Camp at the University of Dayton – a week-long, residential summer program that introduces high school females to career opportunities in engineering through classroom activities, hands-on experiments, industry visits, and exposure to engineers (July 7-12, 2013).

➤ **Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges.**

- FY2013, 7 scholarships were awarded (5 in FY2012). New scholarships were awarded at Lakeland Community College and Terra State Community College after many years. Three (3) students from FY2012 have now matriculated into four-year Engineering program at The Ohio State University and Wright State University, where they plan to continue their STEM education and apply for other NASA and OSGC opportunities. Another female student from FY2011 has also transferred to an Engineering Program at the University of Cincinnati.
- Continued support for a curriculum grant awarded to Lorain County Community College to develop a new course in Aerospace (Marlin Linger).
- Provided support for the Lorain County Community College (LCCC) (Marlin Linger, Advisor) student team to attend the "2013 RockOn! Workshop" at NASA's Wallops Flight Facility spearheaded by the Colorado Space Grant Consortium (Christopher J. Koehler, Director).
- Provided support for the Lorain County Community College (LCCC) (Marlin Linger, Advisor) to participate in the Regional Space Grant Consortia Rocket Competition at the Richard Bong State Recreation Area in Kansasville, Wisconsin

- (April 26-28, 2013). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium (R. Aileen Yingst, Director). Plans are to support the team again in the 2014 competition.
- Provided support for a faculty member from Lorain County Community College (LCCC) (Marlin Linger) who showcased a display of the rocket team at the “4th Annual Ohio Aerospace Institute (OAI) Industry Forum” held at the Cleveland Marriott Downtown at Key Center, in Cleveland, Ohio, which centered on the theme of “Global Business Opportunities for the Future.”
- **Aeronautics research – research in traditional aeronautics disciplines; research in areas that are appropriate to NASA's unique capabilities; directly address the fundamental research needs of the Next Generation Air Transportation System (NextGen).**
- Continued research support to the SIERRA Project at the University of Cincinnati (Kelly Cohen).
 - The following University of Cincinnati Aerospace Engineering students are working on Aeronautics research on the following projects:
 - Kyle A. Flexner, “Fuzzy Based Strategy for Autonomous Spatial Decision Making with Checkers”
 - Adam R. Gerlach, “Trajectory Tracking by Approximate Inverse Dynamics”
 - Andrea M. Gillis (female), “An Exploration of Conjugate Heat Transfer”
 - Nicholas S. Heeb, “Azimuthally Varied Noise Reduction Technologies for Supersonic Jet Noise Reduction”
 - Owen B. R. Macmann, “Using Fuzzy Logic to Solve Sudoku Puzzles”
 - Sophia M. Mitchell (underrepresented female), “Comparison of Fuzzy Optimization” and Genetic Fuzzy Methods in Solving a Modified Traveling Salesman Problem”
 - At Kent State University, Chelsea D. Atkins (underrepresented female), is working on research entitled: “NextGen: The Future of Air Traffic”.
- **Environmental Science and Global Climate Change – research and activities to better understand Earth's environments.**
- Continuing support to Ohio University, Ryan L. Fogt, “Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)”
 - Research grant to The University of Toledo, “Inspiring Student Science Interest Through Real-World Climate Change Projects,” Kevin P. Czajkowski.
- **Diversity of institutions, faculty, and student participants (gender, underrepresented, underserved).**

Institutions – The OSGC represents many diverse institutions across the State of Ohio in the execution of its programs including universities (2 Minority Serving Institutions which include Central State University (HBCU) and Wilberforce University (HBCU) which holds the distinction of being the oldest HBCU in the United States), colleges,

community colleges, Government agencies, and education outreach partners. The Ohio Aerospace Institute (OAI) is the lead institution (501 (c) (3) non-profit organization located in Cleveland and is an active participating OSGC member providing financial support (\$100,000 in support of scholarships and fellowships) and supplementary support as part of the required match.

Faculty/Staff – The OSGC currently has 27 members [Director and 25 Campus Representatives (Associate Director included in Campus Representatives' total) from Ohio colleges, universities, community colleges, and 1 representative (female) from Ohio Aerospace Institute, the lead institution). Diversity for the OSGC membership includes 6 underrepresented members (22.22%) and 4 female members (14.81%). Seventeen individuals from (16) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering)]. Diversity for the OSGC Executive Committee includes 5 underrepresented members (29.41%) and 1 female member (5.88%). In addition, the Ohio Aerospace Institute representative and the OSGC Program Manager are both females.

Students – Of the total 113 student awards in FY2013, the total of participating underrepresented students was 29 (25.66%) which exceeded the OSGC's target of 20% and the National Center for Education Statistics (Table 265) target of 19.55%. The total of participating female students was 40 (35.40%) which did not meet the NASA target of 40%. This was due to the absence of Augmentation funding where planned additional senior scholarship awards were to be reserved for women and underrepresented minorities. **Note that an improvement plan to address increased female participation in OSGC Programs was addressed and submitted to NASA Headquarters in December, 2013.*

- **Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities.**

The OSGC Seed Grant Program supports young faculty at Ohio universities and colleges that support and integrate research and education for faculty and post-doctoral researchers within the State of Ohio through collaborations between universities and with NASA Centers, OSGC affiliates, the State of Ohio, the Ohio Aerospace Institute, the Air Force Research Laboratory, and STEM-related industry with the ultimate result to enable them to strongly compete for substantial national awards. OSGC will specifically encourage proposals from underrepresented and female faculty. Following are the types of grants offered: **Faculty Research Initiation Grant Proposal (FRIGP)** - is specifically meant as "seed funding" for untenured faculty to support new, innovative research to provide necessary results for a regular research grant opportunity with a funding agency such as NASA, NSF; **Curriculum Innovation Proposal (CIP)** - to support new, innovation curriculum development to support the development of STEM higher education in areas supported by NASA. Curriculum developments that that can be shared with other schools are especially preferred; **Student-Innovative-Creative-**

Hands-on Project (SICHOP) - to aid in funding for undergraduate student "hands-on" projects. This can be an individual or a group project. A faculty mentor is required.

IMPROVEMENTS MADE IN THE PAST YEAR

- In an effort to meet the 40% female goal in OSGC Fellowships, Higher Education, and Research Infrastructure programs, the OSGC submitted an improvement plan to NASA Headquarters that addresses the decreasing number of participating females in OSGC programs in December, 2013. The improvement plan included goals, SMART objectives, and a timeline consistent with the earlier goals stated in our previous five-year funding proposal to accomplish this.
- Successfully completed all of the FY2012 reporting requirements in the newly rolled out NASA Office of Education Performance Measurement (OEPM) Reporting System ahead of the deadline. Additionally, the OSGC Program Manager is active in the National Space Grant peer group; sharing OSGC materials and OEPM training materials to assist the Space Grant network.
- Kent State University was upgraded to full Affiliate Status in October, 2013. Dr. Gerald O. Thompkins (underrepresented male) Campus Representative, is now a full voting member of the OSGC Executive Committee.
- Due to the increasing number of students participating in the Cooperative Field Experience Programs at their universities, a one-semester scholarship award was instituted where qualified awardees receive one-half of the total scholarship award. For example, one-semester Seniors receive \$2,000 (\$1,750 from OSGC; \$250 from university); one-semester Juniors receive \$1,500 (\$1,250 from OSGC; \$250 from university).
- A new Campus Representative and member of the OSGC Executive Committee with full voting rights was appointed at Central State University. Mr. Gorgui Ndao (underrepresented male) replaced Mr. Clark Fuller who elected to retire from the university in July, 2013.
- A new Campus Representative and member of the OSGC Executive Committee with full voting rights was appointed at Cleveland State University. Dr. Paul Lin replaced Dr. Pamela C. Charity-Leeke who retired from the university and relocated from Ohio to Maryland to join her husband and family in January, 2014.
- A new Campus Representative and member of the OSGC Executive Committee with full voting rights was appointed at The Ohio State University. Dr. Mo Samimy replaced Dr. Füsün Özgüner who has assumed other responsibilities in September, 2013.
- A new Campus Representative was named at Owens Community College. Mr. Randy Wharton replaced Dr. Renay Scott, Provost, to assume the duties in August, 2013.
- For the second time, OSGC supported a student to attend and present research at a National Space Grant Directors' Meeting. Ms. Desirée Cotto-Figueroa (underrepresented female), Doctoral Student, from Ohio University, under the direction of Dr. Shawn Ostermann, presented her research entitled: "*Radiation Recoil Effects on the Dynamical Evolution of Asteroids*" at the 2014 National Space Grant

Directors' Fall Meeting in Charleston, South Carolina. Desirée was also showcased in the "National Space Grant College and Fellowship Program, Celebrating 25 Years" publication, on the OSGC website, and through social media (i.e., facebook and Twitter).

- A research grant was awarded to The Ohio State University for a new student rocket team (Dr. Mei Zhuang (Asian female), Advisor, and Jack Toth, Student Principal Investigator).
- Former OSGC scholarship recipients were recruited and served as evaluators for the annual Student Research Symposium (i.e., Civil Servants from NASA Glenn Research Center – 1 underrepresented male, 2 females).
- The OSGC Director created and distributed quarterly Director eNewsletters to OSGC affiliates via email.
- Two OSGC newsletters were published and disseminated to a full mailing list and also posted on the OSGC website.
- OSGC worked with the OAI's webmaster to update the OSGC website making it fresher, easier to navigate, and more user-friendly. The changes made it easier for the webmaster to maintain the navigation menus and the overall website resulting in time and cost savings. The OSGC website is maintained by the lead institution who provides the webmaster's time as cost share.
- Revised the OSGC Fellowship evaluation procedure whereby all of the applications were downloaded to a secure site where the evaluators (members of the OSGC Executive Committee) could view applications electronically. In the past, multiple hard copies were produced and mailed out individually. The new procedure saved time, copier and mailing costs, and made it easier for the evaluators to view applications electronically.
- Awarded 7 community college scholarships in FY2013 (5 awards in FY2012). New scholarships were awarded at Lakeland Community College and Terra State Community College after many years. Three (3) students from FY2012 have now matriculated into four-year Engineering program at The Ohio State University and Wright State University, where they plan to continue their STEM education and apply for other NASA and OSGC opportunities. Another female student from FY2011 has also transferred to an Engineering Program at the University of Cincinnati.
- Identified and met with a possible new corporate partner, Nordson Corporation, in December, 2013, to explore STEM collaborations and shared student internship opportunities.
- Continued industry partnerships with Orbital Research, Inc., and Cornerstone Research Group. OSGC shared costs for student internships (\$8,000 each) for internships in Summer, 2013.
- The current OSGC Student Display housed at the lead institution was updated to include all OSGC program promotional materials (i.e., scholarship/fellowship application packages, Fact Sheets, Student Journal, Annual Student Research Symposium Proceedings. Additionally, there is an entire wall at the lead institution dedicated with photos of current scholarship and fellowship recipients.
- OSGC updated all of its grant forms (including the on-line forms) to ensure they were uniform to reflect NASA reporting [1) Faculty Research Initiation Grant Proposal (FRIGP); 2) Curriculum Innovation Proposal (CIP); 3) Student-Innovative-Creative-

Hands-on Project (SICHOP); 4) Informal Education Innovation Proposal (IEIP). All grant application forms have been updated as well as grant information provided on the OSGC website, and all on-line grant forms.

- OSGC updated all of its reporting forms for grant recipients to mirror the NASA Office of Education Performance Measurement (OEPM) System Reporting forms and the annual reporting request for participant information that replaced the former CMIS (Consortium Management Information System) forms (i.e., NASA Education Outcomes, gender, race, ethnicity, demographics, cost sharing, higher education course creation, publications, etc.) and to include the new grant categories listed in the bullet above). Individual Word template forms were updated for Research Infrastructure and Higher Education, Precollege, and Informal Education.
- Enhancements were made to the OSGC website to allow grant seekers to apply on-line, or have the option of submitting their application on-line as a single PDF file.
- Enhancements were made to the OSGC website to allow grant recipients to download the NASA Office of Education Performance Measurement (OEPM) System Reporting forms for each of the OSGC grant categories on-line, or have the option of submitting their final report on-line.
- Became more proficient using social media to promote NASA opportunities and OSGC events (i.e., facebook, Twitter). Upgraded with LinkedIn in an effort to become more engaged with other professional networks, students, faculty, and professionals.
- Updated OSGC list-servs to advertise NASA and other STEM opportunities (i.e., disseminate 1-2 opportunities weekly).
- Work with the OAI Webmaster to advertise NASA and other STEM opportunities on the OSGC website.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The Ohio Space Grant Consortium (OSGC) represents many diverse institutions across the State of Ohio in the execution of its programs including universities, (2 Minority Serving Institutions which include Central State University and Wilberforce University which holds the distinction of being the oldest HBCU in the United States), colleges, community colleges, Government agencies, non-profit organizations, and education outreach partners.

Lead Institution – The Ohio Aerospace Institute (OAI) is the lead institution. (501 (c) (3) non-profit organization, located in Cleveland, where the OSGC Program offices are also located. OAI’s mission is to build Ohio's aerospace economy through research and technology development, education and training, workforce preparedness, and engagement with global networks for innovation. OAI is an active participating OSGC member providing financial and supplementary support as part of the required match. OAI also provides additional support by maintaining/hosting the OSGC website.

Management – Dr. Gary L. Slater serves as the Director of the Ohio Space Grant Consortium and Chair of the OSGC Executive Committee and Professor Emeritus, School of Aerospace Systems, College of Engineering and Applied Science, at the University of Cincinnati. Dr. P. Ruby Mawasha, P.E. (underrepresented male) is the

Associate Director of the Ohio Space Grant Consortium and also serves as the OSGC Campus Representative at Wright State University, and Assistant Dean and Director of the Lake Campus Engineering, College of Engineering and Computer Science. Ms. Laura A. Stacko (female) is the Program Manager, and Mr. Timothy M. Hale, student at Lorain County Community College, continues to serve as the Interim Program Assisant while Ms. Arela B. Leidy continues to recover. Ms. Ann O. Heyward, Vice President of Research and Educational Programs serves as the OAI representative for the lead institution to the OSGC.

Membership:

The OSGC currently has 27 members⁴ [Director and 25 Campus Representatives (Associate Director included in Campus Representatives' total) from Ohio colleges, universities, community colleges, and 1 representative from Ohio Aerospace Institute, the lead institution). Diversity for the OSGC membership includes 6 underrepresented members (22.22%) and 4 female members (14.81%). Seventeen individuals from (16) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering)].⁵ Diversity for the OSGC Executive Committee includes 5 underrepresented members (29.41%) and 1 female member (5.88%). In addition, the Ohio Aerospace Institute representative and the OSGC Program Manager are both females.

Affiliate Members and OSGC Executive Committee Members (16):

1) **Air Force Institute of Technology (AFIT)** – (Federal Institution Ph.D. degree-granting university). The Air Force Institute of Technology (AFIT) is the Air Force's graduate school of engineering and management as well as its institution for technical professional continuing education.

Dr. Jonathan T. Black is an Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, and Director, Center for Space Research and Assurance, and serves as the OSGC Campus Representative at AFIT and is a member of the OSGC Executive Committee with full voting rights.

2) **Case Western Reserve University** – (Private Ph.D. degree-granting independent research university). Case Western Reserve was originally founded in 1826 and began as two separate institutions — Case Institute of Technology and Western Reserve College — federated in 1967 to form Case Western Reserve University, and became one of the country's leading research institutions.

⁴ Kent State University was added as a new Participating Member in FY2012 and promoted to Affiliate Member status in FY2013.

⁵Four universities were promoted to Affiliate Member status (Cedarville University in FY2007; Ohio Northern University in FY2008; Miami University in FY2011; and Kent State University in FY2013) as a result of a goal to increase OSGC membership and on the strength of their participation in and contributions to OSGC activities (other participating institutions may be considered for promotion to affiliate status based on performance and the availability of funding).

Dr. Jaikrishnan R. Kadambi is Professor and Associate Chair, Mechanical and Aerospace Engineering, and serves as the OSGC Campus Representative at Case Western Reserve University and is a member of the OSGC Executive Committee with full voting rights.

3) **Cedarville University** – (Private four-year degree-granting university). Cedarville University was founded in 1887 as Cedarville College affiliated with the Reformed Presbyterian Church to provide Christian students with an education that was offered within a spiritual framework. The turbulence of the first 50 years of the 20th century led to hard times. The Baptist Bible Institute of Cleveland, Ohio, were seeking a campus on which to expand, and upon agreement by both trustee boards, ownership of the college was transferred in 1953, and Cedarville College became a Baptist college of arts and sciences. The Board of Directors voted to change the designation of the institution, and in 2000, Cedarville College became Cedarville University.

Dr. Robert Chasnov, P.E., is Senior Professor of Engineering and Associate Chair, and serves as the OSGC Campus Representative at Cedarville University, and is a member of the OSGC Executive Committee with full voting rights.

4) **Central State University** – (Public Historically Black four-year degree-granting university). Central State University's history began in 1856, when the Cincinnati Conference of the Methodist Episcopal Church established the Ohio African University at Tawawa Springs, Ohio. With the advance of the Civil War, the school was forced to close, and in 1862, the African Methodist Episcopal (AME) Church purchased the site and reopened the school in 1863 as Wilberforce University. In 1887, the Ohio General Assembly enacted legislation to create the Combined Normal and Industrial Department at Wilberforce, to provide training for teachers and vocational education. In 1941 the Normal and Industrial Department expanded from a two- to a four-year program. It was legally split from Wilberforce University in 1947, when it became the College of Education and Industrial Arts at Wilberforce, Ohio. In 1951, it was renamed Central State College, and in 1965 the institution achieved university status. Central State University is the only public Historically Black College and University (HBCU) in Ohio.

Mr. Gorgui Ndao (underrepresented male) is Program Manager, for the Center of Excellence in STEM and STEM Education (STEM-X-ED), Center for Student Opportunities, and serves as the OSGC Campus Representative at Central State University and is a member of the OSGC Executive Committee with full voting rights. Mr. Ndao replaced Mr. Clark Fuller, former Campus Representative at Central State, and member of the OSGC Executive Committee, who elected to retire in July, 2013.

5) **Cleveland State University** – (Urban Public Ph.D. degree-granting research university). Cleveland State University's (located in Downtown Cleveland, Ohio) origins can be traced to 1870, when the Cleveland Young Men's Christian Association launched an educational program offering free night classes in German and French. Four day schools opened in the early 1900s, which eventually led to the establishment of the Cleveland School of Technology. The latter institution was reborn as Fenn College in 1930 and adopted a pioneering cooperative education program that alternated classroom

studies with practical workplace experience. With Fenn College as its nucleus, Cleveland State was founded in 1964 as a state-assisted university to provide accessible higher education for the citizens of Northeast Ohio.

Dr. Paul Lin (Asian male) is Associate Dean of Student Affairs, Washkewicz College of Engineering, and serves as the Campus Representative at Cleveland State University and is a member of the OSGC Executive Committee with full voting rights. Dr. Lin replaced Dr. Pamela C. Charity-Leeke, former Campus Representative at Cleveland State University, who retired from the university and relocated from Ohio to Maryland to join her husband and family in January, 2014.

6) **Kent State University** – (Public Ph.D. degree-granting research university). Kent State University was founded as a teacher-training school in 1910, Kent State has become an engine for economic, cultural and workforce development in the region and beyond as one of the premiere Ohio colleges.

Dr. Gerald O. Thompkins (underrepresented male) is Executive Director, Industry and University Research Initiatives, Office of Corporate Engagement and Commercialization and serves as the Campus Representative at Kent State University and is a member of the OSGC Executive Committee with full voting rights. **Note that Kent State University's status was upgraded to an Affiliate Member of the OSGC in FY2013 with full voting rights and membership on the Executive Committee.** Kent State University was welcomed as a new Participating member of the OSGC in FY2012. Dr. Thompkins was formerly a member of the Michigan Space Grant Consortium representing Wayne State University, and the OSGC thanks Dr. Alec D. Gallimore, Director, Michigan Space Grant Consortium, and Ms. Bonnie L. Bryant, Program Manager, Michigan Space Grant Consortium, for referring Dr. Thompkins to the OSGC.

7) **Miami University** – (Public Ph.D. degree-granting research university). Miami University is one of the oldest public universities in the country, made possible by an ordinance signed by President George Washington in 1795. Chartered in 1809, Miami welcomed its first students in 1824.

Dr. Tim Cameron is Professor and Chair of Mechanical and Manufacturing Engineering, and serves as the Campus Representative at Miami University and is a member of the OSGC Executive Committee with full voting rights. Miami University's status was upgraded to an Affiliate Member of the OSGC in FY2011.

8) **Ohio Northern University** – (Private four-year degree-granting comprehensive university). Ohio Northern University was established in 1871 and is an independent, comprehensive university that combines nationally ranked sciences, arts and professional programs in its five Colleges: Arts & Sciences, Business Administration, Engineering, Pharmacy and Law.

Dr. Jed E. Marquart, P.E., is Professor of Mechanical Engineering and serves as the Campus Representative at Ohio Northern and is a member of the OSGC Executive Committee with full voting rights.

9) **The Ohio State University** – (Public Ph.D. degree-granting research university). The Ohio State University (OSU) was established in 1870, when the Ohio General Assembly established the Ohio Agricultural and Mechanical College, through provisions of the Land-Grant Act, signed by President Lincoln in 1862. This legislation revolutionized the nation's approach to higher education, bringing a college degree within reach of all high school graduates. In 1878 the college's name was changed to The Ohio State University. In that same year the first class of six men graduated, and in 1879, the university graduated its first woman. Today, OSU's main Columbus campus is one of America's largest and most comprehensive.

Dr. Mo Samimy is The John B. Nordholt Professor of Mechanical and Aerospace Engineering, and also Director, Aerospace Research Center, Director, Aeronautical and Astronautical Research Laboratories (AARL), and serves as the Campus Representative at Ohio State and is a member of the OSGC Executive Committee with full voting rights. Dr. Samimy and Ohio State also host all of the OSGC Executive Committee meetings held at the Aerospace Research Center in Columbus, Ohio. Dr. Samimy replaced Dr. Füsün Özgüner, former Campus Representative at The Ohio State University, and member of the OSGC Executive Committee, who has assumed other responsibilities in September, 2013.

10) **Ohio University** – (Public Ph.D. degree-granting university). Ohio University was founded in 1804 and holds the honor as the first university established in Ohio, and the ninth oldest public university in the United States.

Dr. Shawn Ostermann is Associate Dean for Research, Graduate Studies, and Planning in the Russ College of Engineering and Technology, and serves as the Campus Representative at Ohio University and is a member of the OSGC Executive Committee with full voting rights.

11) **The University of Akron** – (Public Ph.D. degree-granting research university). The University of Akron was founded in 1870 as Buchtel College. In 1913 ownership was transferred to the City of Akron, and in 1967, the university became a state institution.

Dr. Craig C. Menzemer is Associate Dean of Graduate Studies and Administration and Interim Associate Dean of Undergraduate Programs, College of Engineering, and serves as the Campus Representative at The University of Akron and is a member of the OSGC Executive Committee with full voting rights.

12) **University of Cincinnati** – (Urban Public Ph.D. degree-granting research university). The University of Cincinnati was founded in 1819 when both Cincinnati College and the Medical College of Ohio were chartered. In 1870: the City of Cincinnati established the

University of Cincinnati, which later absorbed the two predecessor institutions. In 1906, the University of Cincinnati created the first cooperative education program in the world!

Dr. Kelly Cohen, is Associate Professor of Aerospace Engineering, School of Aerospace Systems, College of Engineering and Applied Science, and serves as the Campus Representative at the University of Cincinnati and is a member of the OSGC Executive Committee with full voting rights.

13) **University of Dayton** – (Private Ph.D. degree-granting university). The University of Dayton (UD) was founded in 1850 as St. Mary's School for Boys. Also known at various times as St. Mary's Institute and St. Mary's College, UD assumed its present identity in 1920. UD is one of three Marianist universities in the nation, and is the largest private university in Ohio.

Dr. John G. Weber is Associate Dean, School of Engineering, and serves as the Campus Representative at the University of Dayton and is a member of the OSGC Executive Committee with full voting rights.

14) **The University of Toledo** – (Public Ph.D. degree-granting research university). The University of Toledo was established in 1872 and became a member of the state university system in 1967. The University of Toledo and the Medical University of Ohio merged in 2006 to form the third-largest public university operating budget in Ohio.

Dr. Lesley M. Berhan (underrepresented female) is Associate Professor of Mechanical, Industrial, and Manufacturing Engineering Department, and serves as the Campus Representative at The University of Toledo and is a member of the OSGC Executive Committee with full voting rights.

15) **Wilberforce University** – (Private Historically Black four-year degree-granting university). Wilberforce University was founded in 1856 by members of the Methodist Episcopal Church and holds the honor of being the **first HBCU in the country!**

Dr. Edward A. Asikele (underrepresented male) is Dean, Engineering and Computing, and serves as the Campus Representative at Wilberforce University and is a member of the OSGC Executive Committee with full voting rights.

16) **Wright State University** – (Public Ph.D. degree-granting comprehensive university). Wright State University (WSU) was founded in 1964 as the Dayton branch campus of both Miami University and The Ohio State University—most of the land was donated by the United States Air Force, from excess acreage of Wright-Patterson Air Force Base. A 1965 act of the Ohio General Assembly stipulated that the Dayton campus would become an autonomous 4-year institution once it reached an enrollment of 5,000 students. Several names were considered, and WSU was eventually chosen to honor the Wright Brothers, who were residents of Dayton and invented the first successful aircraft in the city. In 1967, after enrollment passed the 5,000-student mark, Senate Bill 212 passed to actually create a new university and the official charter of Wright State University.

Dr. P. Ruby Mawasha, P.E. (underrepresented male) is the Associate Director of the Ohio Space Grant Consortium and also serves as the OSGC Campus Representative at Wright State University, and Assistant Dean and Director of the Lake Campus Engineering, College of Engineering and Computer Science. Dr. Mawasha is also a member of the OSGC Executive Committee with full voting rights.

Participating Institutions (2):

1) **Marietta College** – (Private four-year degree-granting university). Marietta College was founded in 1835 as one of America's 37 "Revolutionary Colleges," institutions with origins reaching back to the 18th century, and was originally founded as the Muskingum Academy in 1797. Historic Marietta, Ohio, was the first permanent settlement of the Northwest Territory.

Professor Ben W. Ebenhack is an Associate Professor, Department of Petroleum Engineering and Geology, and serves as the Campus Representative at Marietta College.

2) **Youngstown State University** – (Urban Public Ph.D. degree-granting urban university). Youngstown State University's origins trace back to 1908, when the YMCA established a school of law within the Youngstown Association School. In 1921, the school became known as the Youngstown Institute of Technology and offered its first evening courses. In 1928, the institute once again changed its name to Youngstown College. In 1955, Youngstown College was renamed as Youngstown University, an indication of the school's broadening curriculum. In 1967, after becoming a public institution, Youngstown University became officially known as Youngstown State University.

Dr. Hazel Marie (female) is Chairperson and Associate Professor, Mechanical and Industrial Engineering, and serves as the Campus Representative at Youngstown State University. Dr. Marie was a former OSGC fellowship recipient from The University of Akron where she received her Doctoral Degree in Mechanical Engineering.

Minority Serving Institutions (MSIs) (2):

Ohio holds the honor of having the nation's oldest private, historically black university named to honor the great 18th century abolitionist, William Wilberforce—hence the founding of Wilberforce University. Central State University is Ohio's only public MSI. Central State University and Wilberforce University are Minority Serving Institutions (MSIs) and both are active members of the OSGC and full voting members on the OSGC Executive Committee. Both Campus Representatives from Central State University and Wilberforce University are underrepresented males.

Community Colleges (7):

1) **Columbus State Community College** – (Associate degree-granting community college). Columbus State Community College was first established as Columbus Area Technician's School in 1963 and was renamed Columbus Technical Institute in 1965 and was renamed again to its current name in 1987.

Mr. Jeffery M. Woodson (underrepresented male) is Professor, Engineering Technologies Department, and serves as the OSGC Campus Representative at Columbus State Community College.

2) **Cuyahoga Community College (Tri-C)** – (Associate degree-granting community college). Cuyahoga Community College opened in 1963 as Ohio's first community college and remains Ohio's oldest and largest public community college.

Mr. David Frazee is the Associate Dean of Health Careers and Science, and serves as the OSGC Campus Representative at Cuyahoga Community College.

3) **Lakeland Community College** – (Associate degree-granting community college). Lakeland Community College was established in 1967, and was the first college in Ohio founded by a vote of the people. In 1964, area residents met to consider establishing a community college in Lake County, and after the group had gathered enough evidence to justify its establishment, the local League of Women Voters petitioned successfully to place the issue on a countywide ballot, and it passed in 1965; the passage of the related levy passed in 1967. Classes began later that year in various locations in Painesville; the college purchased land for its current permanent location in Kirtland in 1968, with classes commencing there in 1971.

Dr. Margaret F. Bartow (female) is Executive Vice President and Provost and Dean of Faculty, and serves as the OSGC Campus Representative at Lakeland Community College.

4) **Lorain County Community College** – (Associate degree-granting community college). Lorain County Community College (LCCC) was granted a charter to serve Lorain County's higher education needs in 1963. In 1964, the citizens of Lorain County supported a 1.25 mil levy to provide funding, and the Lorain School of Technology was incorporated into LCCC, and the first classes were held in the summer in rented facilities. In 1966, LCCC moved to its current location in Elyria, making LCCC the first community college in Ohio to have a permanent campus.

Dr. George Pillainayagam is Engineering Program Director, and serves as the OSGC Campus Representative at Lorain County Community College.

5) **Owens Community College** – (Associate degree-granting community college.) Owens Community College is named after Michael J. Owens, a Toledo inventor who changed the glass industry by mechanizing bottle blowing in 1903. Owens Community College began as a technical institute under the jurisdiction of the Ohio Department of Education. The first classes were offered in Toledo in 1965, and two years later, in 1967, the College was chartered by the Ohio Board of Regents as a technical college. In 1983, Owens Community College opened its Findlay-area campus, and in 1994, the College was chartered as a comprehensive state community college with a district encompassing Lucas, Wood and Hancock counties, and parts of Ottawa and Sandusky counties.

Mr. Randy Wharton, MSNE, is Dean, School of Science, Technology, Engineering, and Mathematics, and serves as the OSGC Campus Representative at Owens Community College. Mr. Wharton replaced Dr. Renay Scott, Provost, to assume the duties in August, 2013.

6) **Sinclair Community College** – (Urban Associate degree-granting community college). Sinclair Community College is named for David A. Sinclair, a Scottish immigrant and secretary of the Dayton YMCA (1874–1902), who founded the adult training school that eventually became Sinclair College in 1948. Although the college was still housed in the YMCA buildings, by 1959 it was independently operated and separately incorporated as a non-profit institution of higher learning under the laws of the State of Ohio. The State Board of Education authorized Sinclair to continue to conduct a junior college program and confer associate degrees in arts and sciences. The official plan for the community college was approved by the Ohio Board of Regents in 1966. Professor Kent Wingate is the Chairman, Aviation Technology Department, and serves as the OSGC Campus Representative at Sinclair Community College.

7) **Terra State Community College** – (Associate degree-granting community college). Terra State Community College's roots go back to 1968, when the Vanguard Technical Institute opened to 78 full-time engineering and business students. In 1973, the name was officially changed to Terra Technical College. The name was changed again to Terra State Community College in 1994.

Dr. James L. Bighouse is Associate Professor, Physics, and serves as the OSGC Campus Representative at Terra State Community College.

Colleges of Education (15):

The OSGC also collaborates with the College of Education at OSGC-member universities to recruit and award Education scholarships (for pre-service teachers) to students seeking certification in Science and mathematics. The following universities are eligible for the scholarships along with the individuals serve as our contacts:

1) **Cedarville University** – (Private four-year degree-granting university). Dr. Robert Chasnov, P.E., is Senior Professor of Engineering and Associate Chair, and serves as the OSGC Campus Representative at Cedarville University, and is a member of the OSGC Executive Committee with full voting rights. Dr. Chasnov also serves as the OSGC contact in the College of Education at Cedarville University.

2) **Central State University** – (Public Historically Black four-year degree-granting university). Dr. Rajeev Swami, Professor, Science Education, serves as the OSGC contact in the College of Education at Central State University.

3) **Cleveland State University** – (Urban Public Ph.D. degree-granting research university). Dr. Jane A. Zaharias, Associate Dean of Student Services, Alumni Affairs and External Relations in the College of Education and Human Services and Professor of

English education in the Department of Teacher Education, serves as the OSGC contact in the College of Education at Cleveland State University.

4) **Kent State University** – (Public Ph.D. degree-granting research university).

Dr. Gerald O. Thompkins (underrepresented male) is Executive Director, Industry and University Research Initiatives, Office of Corporate Engagement and Commercialization and serves as the Campus Representative at Kent State University and is a member of the OSGC Executive Committee with full voting rights. Dr. Thompkins also serves as the OSGC contact in the College of Education at Kent State University.

5) **Marietta College** – (Private four-year degree-granting university). Dr. Cathy Mower, Associate Professor of Education, serves as the OSGC contact in the College of Education at Marietta College.

6) **Miami University** – (Public Ph.D. degree-granting research university). Dr. Ann Haley MacKenzie, Associate Professor, Department of Teacher Education, and Special Professor, Department of Science, Math and Computer Technology, University of Johannesburg, serves as the OSGC contact in the College of Education at Miami University.

7) **Ohio Northern University** – (Private four-year degree-granting comprehensive university). Dr. Sandra J. Schroeder, Assistant Professor of Mathematics, Mathematics Department, serves as the OSGC contact at Ohio Northern University.

8) **The Ohio State University** – (Public Ph.D. degree-granting research university). Dr. Cesar Seguil, Academic Advisor, College of Education & Human Ecology, Teaching & Learning Office of Academic Services, serves as the OSGC contact in the College of Education at The Ohio State University.

9) **Ohio University** – (Public Ph.D. degree-granting university). Dr. Shawn Ostermann is Associate Dean for Research, Graduate Studies, and Planning in the Russ College of Engineering and Technology, and serves as the Campus Representative at Ohio University and is a member of the OSGC Executive Committee with full voting rights. Dr. Ostermann also serves as the OSGC contact in the College of Education at Ohio University.

10) **The University of Akron** – (Public Ph.D. degree-granting research university). Dr. Craig C. Menzemer is Associate Dean of Graduate Studies and Administration and Interim Associate Dean of Undergraduate Programs, College of Engineering, and serves as the Campus Representative at The University of Akron and is a member of the OSGC Executive Committee with full voting rights. Dr. Menzemer also serves as the OSGC contact in the College of Education at The University of Akron.

11) **University of Cincinnati** – (Urban Public Ph.D. degree-granting research university). Dr. Regina Sapona, Associate Dean, Academic Affairs, Teachers College, and Ms. Cammie Hulett, Assistant Academic Director and Scholarship Coordinator, College

of Education, Criminal Justice, and Human Services, Dean's Office, jointly serve as the OSGC contacts in the College of Education at the University of Cincinnati.

12) **University of Dayton** – (Private Ph.D. degree-granting university). Kathryn Kinnucan-Welsch, Ed.D., Associate Dean for Undergraduate Learning and Community Partnerships, School of Education and Allied Professions serves as the OSGC contact in the College of Education at the University of Dayton.

13) **The University of Toledo** – (Public Ph.D. degree-granting research university). Ms. Libbey McKnight, Enrollment Management Specialist, Judith Herb College of Education, serves as the OSGC contact in the College of Education at The University of Toledo.

14) **Wright State University** – (Public Ph.D. degree-granting comprehensive university). Mr. Chris A. Murphy, Assistant Dean, Office of Student Services, College of Education and Human Services, serves as the OSGC contact in the College of Education at Wright State University.

15) **Youngstown State University** – (Urban Public Ph.D. degree-granting urban university). Ms. Karen L. Henning, Academic Advisor, Office of Student Services Beeghly College of Education, serves as the OSGC contact in the College of Education at Youngstown State University.

Other Partners:

•Government affiliates include the NASA Centers (especially Glenn Research Center whose personnel regularly attends OSGC Executive Committee meetings at The Ohio State University—[Educational Programs Office (Dovie Lacy and Robert LaSalvia), Education Specialist (Susan Kohler) (formerly NASA Aerospace Education Services Project (AESP), Educator Resource Center Network (ERCN) (Monica Boyd); University Programs Office (M. David Kankam)]; the Air Force Research Laboratory, Wright-Patterson Air Force Base Education Outreach, Ohio Board of Regents, State of Ohio Aerospace and Defense. All the government affiliate representatives are very involved with the OSGC, attend meetings regularly, and work well with the Director and others. NASA CORE (Central Operation of Resources for Educators) offices closed during FY2013. NASA CORE was a partner who assisted the OSGC with teacher workshops and pre-service teacher scholarships (i.e., resources for teachers, students and NASA education materials).

•Industry partnerships include ArcelorMittal, Cornerstone Research Group, Inc. (CRG), Etegent Technologies, L-3 Cincinnati Electronics (CE), Sierra Lobo, ZIN Technologies. Orbital Research, Inc. OSGC continues to improve membership in this area and is working with the lead institution, the State of Ohio, and others to add additional industry members.

•Foundation partnerships which include the Nordson Foundation and the Nord Family Foundation who have provided financial support for OSGC scholarships and fellowships.

•State of Ohio partnerships include Choose Ohio First (COF) Scholarship Program through the Ohio Board of Regents (OBOR), awards Ohio colleges, universities and their business partners that have developed innovative academic programs to recruit and retain more Ohio

students into STEMM (Science, Technology, Engineering, Mathematics, and Medicine) fields. Funding received is used to offer scholarships for those programs to current and potential students. COF has provided financial support for OSGC scholarships and fellowships.

•Education Outreach Partners include the Cincinnati Observatory Center, Cleveland Museum of Natural History, Drake Science Center, iSPACE, and informal educational partners throughout Ohio. OSGC also has an ongoing presence at the Cleveland Museum of African American History. Continue to collaborate with an education outreach partnership that was formed in FY2012 with OH WOW! The Roger & Gloria Jones Children's Center for Science & Technology in Youngstown, Ohio, as the result of a former OSGC Education scholar's new role as the Center's Education Manager. Many of the outreach affiliates receive OSGC mini-grants and seed grants for innovative STEM programs.

The National Space Grant Office requires two annual reports, the Annual Performance Data Report (APD) and the Office of Education Performance Measurement System (OEPM) report. The former is primarily narrative and the latter data intensive. Because the reporting timeline cycles are different, data in the two reports may not necessarily agree at the time of report submission. OEPM data are used for official reporting.